



CORROSION MITIGATION INSTRUMENTATION
2828 FM 758, NEW BRAUNFELS, TX 78130 TEL: (830) 253-5621

MODEL TRiSTAR

50 Amp, GPS Current Interrupter User Manual

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Parts List

<u>DESCRIPTION</u>	<u>QTY</u>	<u>DESCRIPTION</u>	<u>QTY</u>
Interrupter	1	Power cable, AC	1
Connection cables (set)	1	User Manual	1
Data Transfer cables (USB A/B)	1	Warranty Card	1

Unpacking

The instrument is housed in a thermoplastic resin case which includes a storage area for all the cables. Please open the case and remove all cables to ensure that the Model TRiStar has shipped with all included parts, as listed above.

If any parts are missing, please contact Tinker & Rasor immediately. If the instrument has been damaged in shipping, do not delay in filing a claim with the carrier.



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your local time based upon your GPS position. If the time displayed is not correct, it can be adjusted in the following steps. Pressing the *OK* button brings up the Time / Position Sub Menu.

Time / Position Sub Menu

The Time / Position Sub Menu has three options:

1. Time Zone
2. Set DST
3. View GPS Data

Time Zone

The TRiStar uses the GPS location to automatically adjust the time to a local time zone. However, as most time zones are set as political boundaries and not by exact Latitudinal and Longitudinal lines, the automatic adjustment may be incorrect. The TRiStar allows the user to manually set the time zone so the correct local time is displayed.

Pressing #1 from the Time / Position Sub Menu brings up a screen that shows:

1. AUTOMATIC
2. manual

The current setting of the TRiStar is shown in all CAPITOL letters. The alternative choice is show in all lowercase letters. To change from one setting to the other, press the appropriate button, one (1) or two (2). The text will change to all CAPITOL letters showing your choice was made correctly.

If MANUAL is selected, pressing *OK* brings a screen that has a list of time zones. A major city is listed for each of the world's time zones. Use the arrow buttons on the keypad to select the city which is in the time zone you wish to use. When the correct time zone is highlighted, press the *OK* button. The change will be confirmed. After pressing *OK* again, the display will show the new time and date.

If AUTOMATIC is selected, pressing *OK* changes the display to show the time and date.

Press *OK* to return to the Time / Position Sub Menu.

Set DST

The TRiStar does not automatically adjust for Daylight Savings Time (DST). If your time zone uses Daylight Savings Time you can set the TRiStar to observe this by pressing #2 from the time / Position Sub menu.

The display screen will show:

Daylight Savings Time

1. on
2. OFF

Again, all CAPITOL letters indicates which setting is in effect. Press the appropriate number button to make a change. Press *Cancel* to not make a change and return to the Time / Position Sub Menu. Press the button associated with the lowercase letters text and press *OK* to change the settings. The screen will change to show the new time and Date. Pressing *OK* again will return you to the Time / Position Sub Menu.

NOTE: Daylight Savings Time is observed in the United States during the summer months. The local time in some US time zones is set forward by one hour. This event may be in use in other parts of the world and referred to in a different manner. The TRiStar will not automatically adjust to DST, and so this setting will need to be changed again when Standard time resumes.

View GPS Data

Pressing #3 in the Time / Position Sub Menu will bring up the actual GPS Time and Date information. This information is displayed in UTC. The Latitude and Longitude of the TRiStar unit is also displayed

here. Press OK to display the current local time and date. Press OK again to return to the Time / Position Sub Menu.

To return to the Settings Sub Menu, use the *Up* button on the keypad.

Cycling Settings Sub Menu

The Cycling Settings Sub Menu offers three settings which can be changed by the user. These settings effect the way the TRiStar operates during an interruption cycle. The three options are:

1. Set First Cycle
2. Set Cycling Mode
3. Standby Settings

Set First Cycle

The First Cycle determines whether the TRiStar will begin in the ON or OFF position when interrupting starts.

NOTE: The TRiStar is able to operate in sync with GPS current interrupters made by manufacturers other than Tinker & Rasor, the TRiStar is able to adjust whether it begins operation in the ON or OFF position. Refer to the user manual of your non TRiStar units to see which cycle mode they use.

To make a change to the TRiStar Cycle Mode, press #1 from the Cycling Settings Sub Menu. The display changes to show:

First Cycle

1. open
2. CLOSED

Again, the all CAPITOL letters shows which setting is currently in effect. To change this, press the appropriate number and press OK. To not make a change, press Cancel. Pressing OK or Cancel will return you to the Cycling Settings Sub Menu.

Set Cycling Mode

Set Cycling Mode will change how the TRiStar interprets the Start Time and Stop Time of a program in memory. Continuous Mode means the TRiStar will run its interrupt program from the Start Date and Start Time continuously until the Stop Date and Stop Time are reached. In Periodic Mode, the TRiStar will interrupt starting at the Start Date and Start Time, but will stop at the Stop Time each day the programs run.

To change this setting, press #2 from the Cycling Settings Sub Menu. The screen will show:

Cycling Mode

1. continuous
2. PERIODIC

Press the appropriate number to change the setting and the confirmation screen will show the change by changing the text from lowercase to CAPITOL letters. Press OK to return to the Cycling Settings Sub Menu. Press Cancel to return without changes.

Standby Settings

The TRiStar allows the user to change the status of the interrupter to be ON or OFF when in Standby Mode. Standby Mode occurs when the TRiStar is waiting to run an interrupter program, or is in Periodic Mode and waiting for the next Start Time to occur. By default, the Model TRiStar is in the ON or Closed



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position when in Standby Mode. To change this, press #3 in the Cycling Settings Sub Menu. The screen will show:

Standby Settings:

1. open
2. CLOSED

Press the appropriate number to change the setting and the confirmation screen will show the change by changing the text from lowercase to CAPITOL letters. Press OK to return to the Cycling Settings Sub Menu. Press Cancel to return without changes.

Reset Settings

Choosing #2 from the Settings Menu will give the user the option of resetting all of the user settings, as described in the last section above, back to the factory default.

The factory default settings are:

Time/Position Settings, Time Zone = Automatic

Cycling Settings, First Cycle = ON

Cycling Settings, Cycling Mode = Periodic

Cycling Settings, Stand By Settings = ON

Over Voltage Alarm

The Model TRiStar is equipped with an alarm that will sound in the event of an over voltage condition.

If the system that the TRiStar is connected to has more than 240v DC or AC, the unit will emit a high pitched, continuous beep to alert you of an over voltage. Immediately disconnect the cables from the side of the instrument, to prevent damage to the internal circuitry.

NOTE: The over voltage alarm will sound differently for DC over voltage than AC over voltage. If any sound is heard coming from the TRiStar, immediately disconnect the interrupt cables.

If the output of the rectifier that the TRiStar is attached to meets the specifications of the current interrupter, the over voltage condition may be a result of the connection to pipe or structure. Please use caution when investigating the voltage on a pipe or structure, as there may be much more voltage and/or current than assumed.

Service

If the TRiStar needs to be shipped back to Tinker & Rasor for any reason, a suitable box will need to be found. UPS and other carriers will charge extra fees if the unit is shipped without a box. Also, the exposed heat sink could become damaged without an outer carton.

When shipping to Tinker & Rasor, instruments should be sent PREPAID, to:

Tinker & Rasor
ATTN: Repairs
2828 FM 758
New Braunfels, TX 78130

For any changes to these instructions, or for the most up to date information, please always check online.

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Troubleshooting

If . . .

Then . . .

There is a high pitched squeal or buzzing sound coming from the TRiStar	This is the over voltage alarm. Immediately disconnect the cables from the instrument.
Some TRiStars show a different time than others with GPS Lock	When programming multiple units to work in sync, first reset all user settings to factory default. From the main menu, choose 3 -> <i>Settings</i> , 2 -> <i>Reset Settings</i> , OK. This is most likely due to incorrect DST or Time Zone settings.
When I push the Power button, nothing happens	The Power button on the panel of the TRiStar requires you to <u>push and hold down</u> the button for three (3) seconds.
The A/C cord that came with the unit does not fit the rectifier / wall power in my location	The included A/C cord is meant for use with 120v A/C in the US and Canada. A different cord may be required for use in your location. The TRiStar will operate from either 110v or 240v AC.
I have lost the Data Transfer cable or A/C power cord	The Model TRiStar uses standard computer cables for the sync function and A/C power. These types of cables are very common throughout the world, and should be easy to source in your area.

How Do I . . .

Set the TRiStar so that it stops cycling each day of my program?	Under the <i>Settings</i> menu, sub-menu <i>Cycle Settings</i> , choose option 2 for <i>Cycling Mode</i> . <i>Continuous</i> means the TRiStar will cycle 24 hours a day during the days of the program. <i>Periodic</i> means that the TRiStar will run its program only during the programmed times, each day of the program.
Add another TRiStar to a group of TRiStars already running a program?	Use the <i>Get in Sync</i> feature to add a new unit to a group. Use the <i>Manual Cycle</i> sub-menu and choose <i>Get in Sync</i> . This will allow you to enter program data for a date and time in the past. The TRiStar will figure the exact moment to start the program and be in sync with all the other units already running.
Get the TRiStar to start in the OPEN or in the CLOSED position, so it can be used with other manufacturers' interrupters?	The Model TRiStar can be changed so that it starts in either the OPEN (Off) or CLOSED (On) conditions. By default, the TRiStar starts in the CLOSED (On) condition. This can be changed under the <i>Settings</i> menu, Sub-menu <i>Cycle Settings</i> , option 1.
Get the TRiStar to depolarize my pipeline before a survey?	Use the <i>Set Standby Condition</i> under the <i>Settings</i> menu, sub-menu <i>Cycle Settings</i> , option 3.
Tell if any given option in the menu is active or not?	The options available in the menu system will show <u>ALL UPPER CASE LETTERS</u> for the active choice, and <u>all lower case letters</u> for the inactive choice.

TECHNICAL APPENDIX A

Important Note Regarding Rectifier Spikes

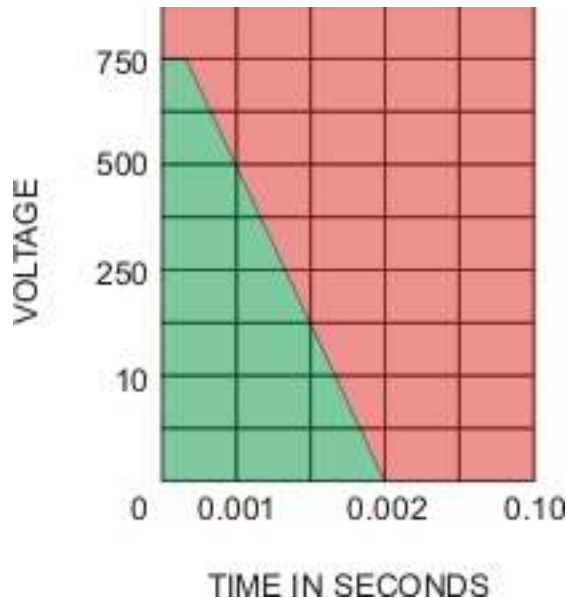
Most rectifiers experience a voltage spike when opening and closing, due to a capacitance effect in the system that can be quite large and very fast. Depending upon the magnitude and duration of the spike, the TRiStar, and most other current interrupters made today, can become significantly damaged.

It is recommended that an oscilloscope be connected to a rectifier and the rectifier be manually cycled to see what type of spike may be present, prior to using an interrupter.

This step becomes especially important when the DC output of the rectifier is $\geq 50\%$ or of the maximum current the interrupter can handle. In the case of the TRiStar, which is a 50 Amp max instrument, a rectifier with an output greater than 24 amps should be investigated with an oscilloscope.

The Magnitude and duration of the voltage spike is expressed in the graph below. The green area of the graph is 0 – 750 volts and 0 – 2 milliseconds (0.002s) of time. The red area shows higher voltages and longer durations which can damage the instrument.

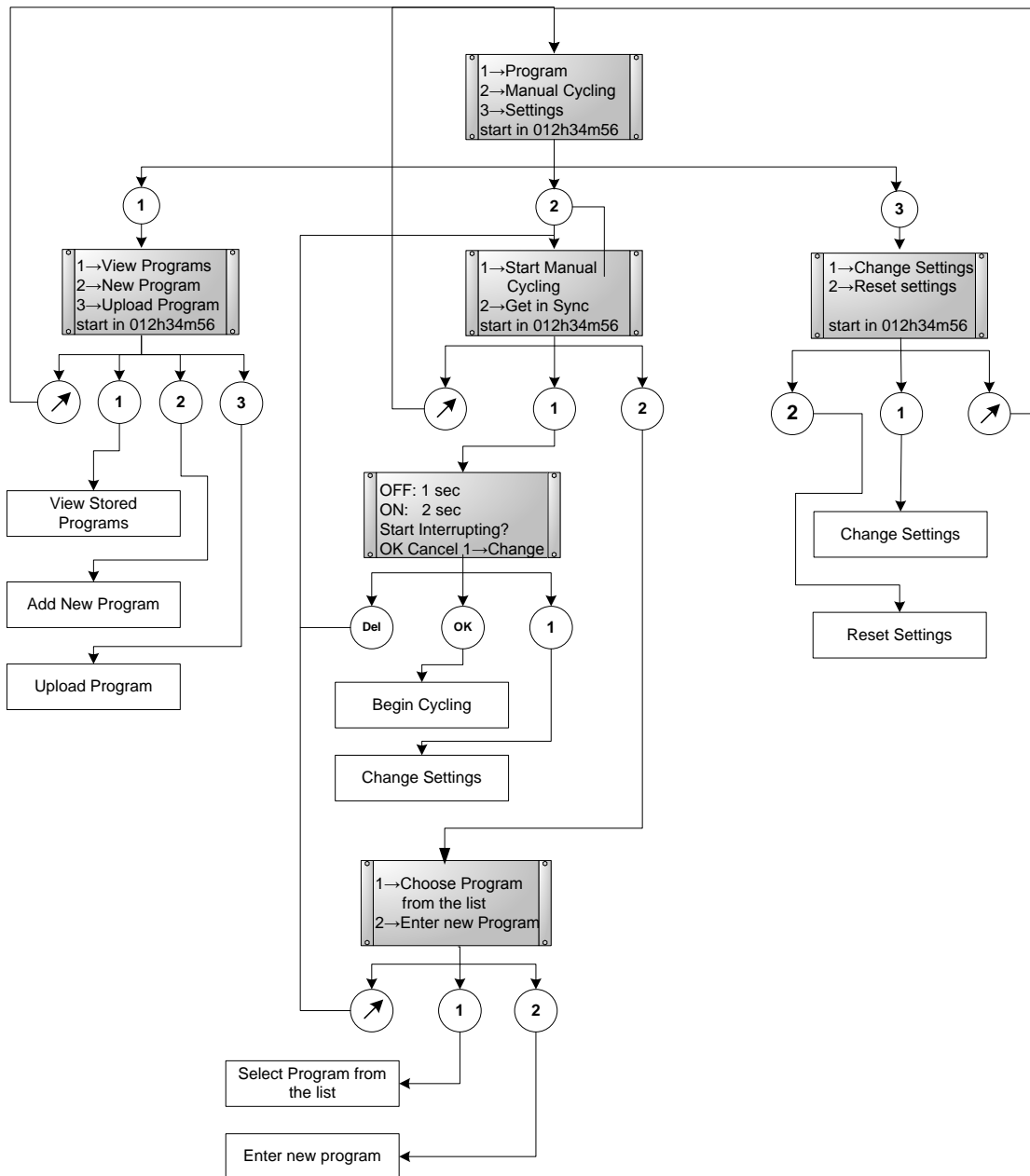
If a rectifier is found to have a voltage spike in the red area of the graph, it is suggested that a connection to earth ground be used when interrupting.



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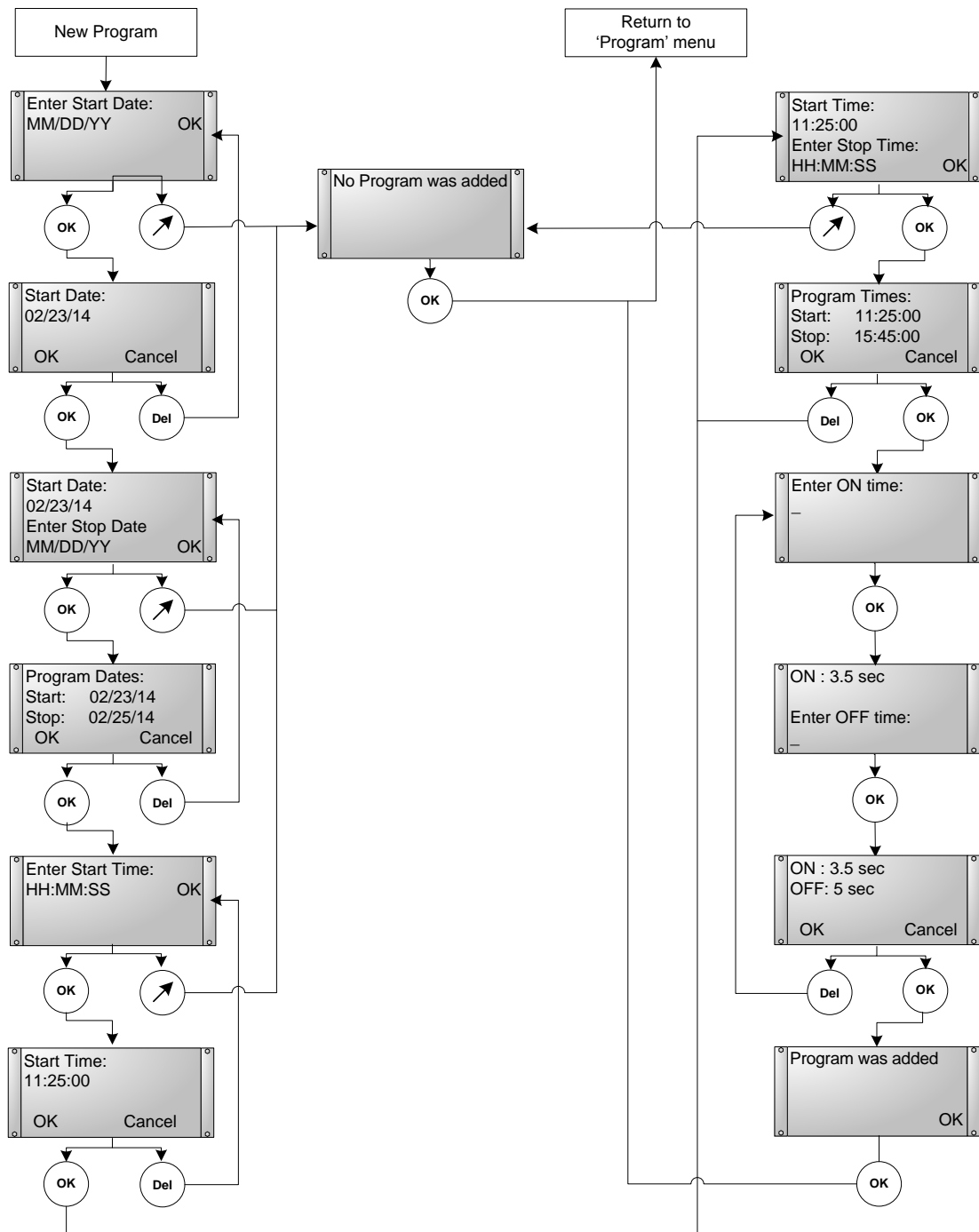
TECHNICAL APPENDIX B

Model TRiStar Current Interrupter Top Level Screen Flow Chart



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Model TRiStar Current Interrupter Add New Program Screen Flow Chart





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Model TRiStar Current Interrupter Change Settings Screen Flow Chart

