



## MODEL QUASAR

### *100 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, with batteries	1	Power cable, AC (110v)	1
Connection cables, Large (set)	1	Battery charger cable, DC (12v)	1
Connection cables, Small (set)	1	User Manual	1
Sync / Data cable	1	Warranty Card	1

#### Getting Started

The Quasar Current Interrupter comes in a cardboard box with an insert to help protect the instrument during shipment. If possible, retain these items for future use in the event the instrument needs to be shipped.

The instrument is housed in a large 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 Quasar 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.

##### Connect the Battery

The Quasar battery is disconnected when shipped and needs to be reconnected prior to use. On the panel of the Quasar is an arrow which points to the switch. (*Battery Disconnect Switch*). The switch is located on the side of the panel, in the storage area, underneath the GPS antenna wire cleat. Slide the switch towards the Power button



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near the top of the panel to reconnect the battery. See the section of this manual titled Maintenance for more information.

### **Introduction**

The Model Quasar is an advanced current interrupting instrument and has many new features not found on previous versions of the Quasar.

After many years of feedback from customers, Tinker & Rasor has added new functionality to the Quasar and updated and upgraded other essential elements of the 100Amp GPS Current Interrupter.

Main Features:

- 12,000 Watt interrupter (100 amps @ 120 volts, 50 amps @ 240v)
- Desert Tan case to blend in with surroundings
- Lockable case (with lid locked closed, or able to open)
- 110v / 240v auto sensing AC power supply
- In case storage for all accessories
- 12v battery lasts up to 40 hours
- 4 line LCD allows more information per screen
- Garmin® GPS technology
- Small connection cables for less than 5amp circuits
- Removable GPS antenna

### **Physical Connections of the Quasar Current Interrupter**

The Model Quasar is an advanced current interrupting instrument and has many features that may not exist on other, similar instruments.

#### Interrupt Connection Cables

The Model Quasar offers two (2) methods of connecting the circuit to be interrupted. The main connection points are located on the side of the instrument case, on the Right when facing the panel. The large connection cables push into the large plugs on the side of the case.

**NOTE: You may notice that the connectors do not fit entirely into the plug. This is normal and not a cause for alarm.**

The large connection cable set is Orange in color and has large clamps on the opposite end. This is the set of cables to use for most connections and applications.

For small current interruption, the large cables and clamps may be inconvenient, and a smaller set of cables have been included for this type of use. The cables come with banana jacks and plug into the same side of the case as the larger cables, just above the plugs.

**NOTE: The small cables with banana jacks are meant for use on circuits with less than 5 amps of current to be interrupted.**

When making the connections to the Quasar there is no need to observe polarity. There is no plus (+) or minus (-) issues when using either set of connection cables.

#### AC Power Cable

The Model Quasar is designed to operate on AC power. The internal AC Power Supply will automatically sense and use either 110v or 240v AC when plugged into an AC power source, often found on rectifiers. The AC power cable included with the Model Quasar is designed for use on 110v AC sources. For areas



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where 240v AC is more common, a suitable AC power cord will have to be purchased for use with the Quasar. The AC plug accepts standard PC computer power cables, and this additional power cord should be easily obtained.

**NOTE: The Quasar will automatically accept either 110v OR 220v AC (single phase) and no switch or adjustment is required.**

For instances where there is no available AC power supply, the Model Quasar is equipped with an internal 12v battery which will allow the Quasar to operate for 35 – 40 hours in most conditions.

### DC Battery Charger

The internal 12v battery will charge when connected to AC power, or when connected to a 12v DC power source, such as a vehicle powerpoint (AKA cigarette lighter). The included DC power cable (adapter) can be used to recharge the Model Quasar internal battery when AC power is not available.

**NOTE: The Quasar battery can be charged via an AC or DC power source, but should never be connected to both at the same time.**

When charging the Quasar 12v battery using the DC power cable, it is important to note that there is no circuit protection against overcharging the battery, and damage to the battery may result if left on DC charge for too long a period. It is not recommended to charge the internal 12v battery on DC for more than 8 hours.

### Synchronization / Data Cables

The Model Quasar can be synchronized with other Quasar instruments for the purpose of transferring programs and also to synch the clocks on non-GPS Quasar units.

The Synch / Data cable is a standard A to B USB cable, frequently used to connect a printer to a computer. The instrument is not USB compliant, and cannot be connected to a printer or a computer.

The Quasars can be synchronized by connecting the instruments in a “daisy-chain” arrangement. The first Quasar in the line becomes the lead instrument. This is the only instrument that does not have a cable inserted into the “B” USB connector, the square type. Communication is made using the “A” or rectangular USB connector as an Output and the “B” or square connector as an Input.

The synch and data transfer operation is done using the keypad, and this is covered later in this manual, in the section titled, Special Features.

### GPS Antenna

The Model Quasar uses a GPS antenna which is magnetically mounted to the main panel. This antenna has a 15’ (4.57 m) lead wire, and may be moved outside of the instrument case to allow the instrument a better view of GPS satellites. The antenna is hardwired into the interior of the case and the antenna cannot be taken off entirely. A small wire cleat is attached to the side of the panel, in the storage area for winding the antenna when it is attached to the main panel of the Quasar.

## Understanding the Panel of the Quasar Current Interrupter

The Model Quasar panel has new features not seen before on previous versions of the Quasar.

The instrument is now turned on using a push button switch. The switch is located in the upper Left corner of the panel, and must be held for 3 seconds to the instrument ON and OFF. The instrument cannot be accidentally turned ON or OFF. An LED will show if the instrument is turned ON.



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Next to the Power Button is the Circuit Closed LED. This LED will light during the interrupt cycle to show when the circuit is ON (Closed).

Below the Power Button is the 12v DC battery charger plug. Use the supplied DC power adapter to charge the Quasar battery from a DC source such as a vehicle battery.

The Sync / Data transfer connections are on the inside side panel, and the main panel indicates where they are located.

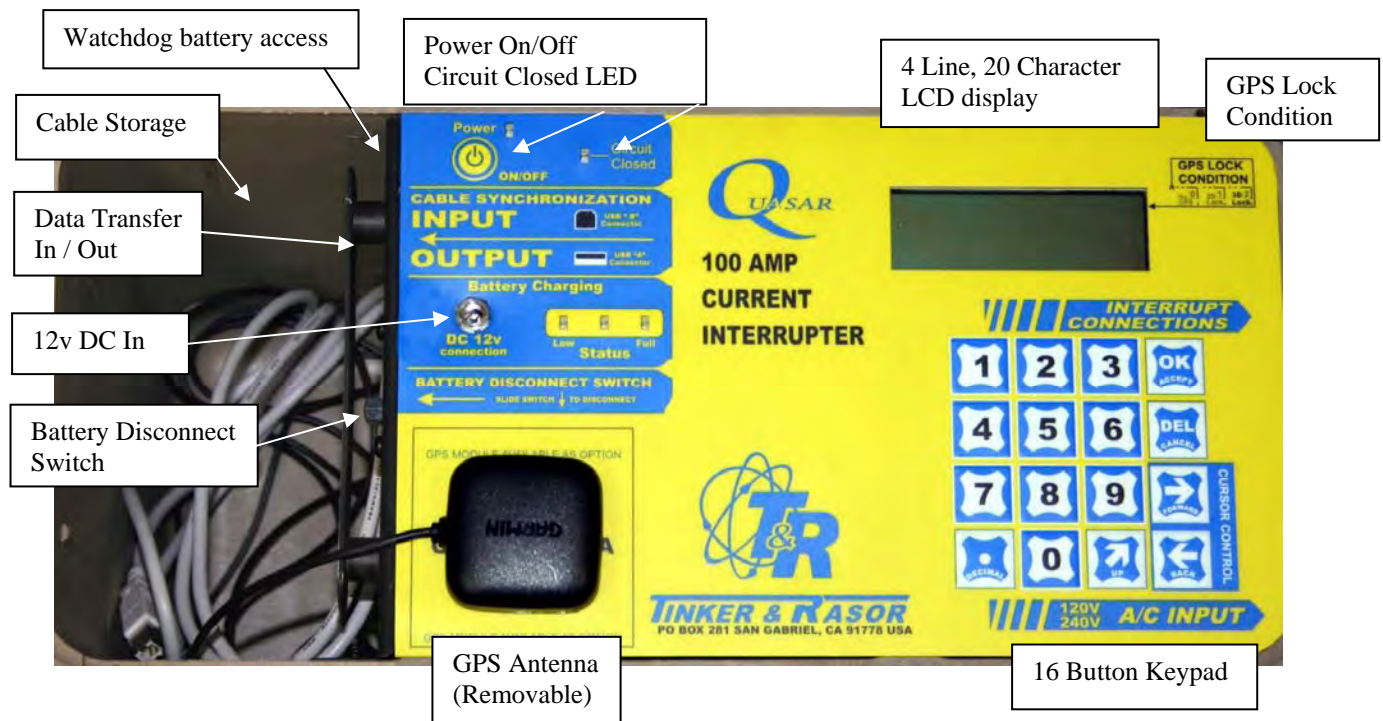
The main 12v battery of the Quasar is disconnected for shipping, and the disconnect switch is located to the Left hand side of the panel, on the inside panel, and an indicator is shown on the main panel.

The magnetic mount GPS antenna area is near the bottom of the main panel, and is where the GPS antenna should be mounted and kept when not outside of the case.

The LCD screen on the panel is a four line, twenty character display which shows much more information per screen than other instruments. The GPS lock condition of the Quasar will be displayed in the upper Right hand corner of the LCD display and will show a "0" for no lock to a GPS satellite, a "1" to show minimal, but sufficient lock to three GPS satellites and a "2" for optimal lock on four or more GPS satellites.

Below the LCD display is an indicator pointing to the interrupt connections on the outside of the case. Near the bottom Right hand side of the main panel is another indicator pointing to the AC connection on the outside of the case.

The Model Quasar panel features are shown below.





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### Using the Keypad

Between these indicators is the sixteen button keypad. The keypad is the main user interface with the instrument and used for all programming and access to all features. Besides the 1 – 9 and 0 keys, there are six other programming keys included with the keypad. They are: OK (Accept), DEL (Cancel), → (Forward), ← (Back), \_-> (Up), and . (Decimal). These keys are used to interact with the Quasar during programming and viewing of features. Most are self explanatory, with the possible exception of the “Up” key. This key will allow the user to move up through the menu tree. This is better described in the section below titled, Quasar Menu System.

### Programming the Quasar

The Quasar is programmed by entering settings via an easy to use menu system. The menu system consists of a Main Menu, Sub Menus, data entry screens and confirmation screens.

The Main Menu is the top level screen and gives you the following options:

1. Program
2. Manual Cycling
3. Settings

Each of these choices is accessed by pushing the appropriate number button on the keypad; 1 = Program, etc.

#### ***Program Sub Menu***

Pressing #1, Program, will bring you to the Program Sub Menu, consisting of the following options:

1. View Programs
2. New Program
3. Upload Programs

**Pressing #1, View Programs**, will show the programs that have been stored in memory. All program data is shown on a single screen. The program data consists of the Program number (#1, #2, #3, etc.) in the upper Left corner of the screen, the Start and Stop Date, the Start and Stop Time and the On and Off Times. Use the *FWD* (Forward) and *BCK* (Back) buttons on the keypad to scroll through all the stored programs.

NOTE: A program can be deleted in the View Program screens by pressing the *Cancel* (Delete) button on the keypad. A confirmation screen will come up when the *Cancel* (Delete) button is pressed to confirm you wish to delete the program. Once the delete program has been confirmed, the program is erased and cannot be retrieved.

If there are no programs stored in memory, the screen will show No Programs Stored.

Pressing #2, New Program, will access the data entry screens to store a new program. Each step of the programming will ask for confirmation of the data entered.

Screen 1: Enter Start Date (mm/dd/yy), Press *Ok* button.

NOTE: mm/dd/yy = two digit month/two digit day/two digit year, example: 01/01/09 for January 1, 2009.

Confirm: Press *OK* or *Cancel* to re-enter the data.

Screen 1: Enter Stop Date (mm/dd/yy). You will see that the Start Date is displayed on the same screen.



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Confirm: *OK* or *Cancel*

NOTE: At any screen during the programming process you can use the Up button on the keypad to go back to the Program Sub Menu. Pressing the Up button again will take you to the Programs sub Menu. Pressing the Up button again will take you to the Main Menu.

Screen 2: Enter Start Time (hh:mm:ss).

NOTE: Time is entered and displayed as two digit Hour (or three digit):two digit minute:two digit second. Time is entered and displayed on the 24 hour clock. Two o'clock and ten minutes and zero seconds is entered and displayed as 14:10:00.

Confirm: *OK* or *Cancel*

Screen 2: Enter Stop Time (hh:mm:ss)

NOTE: Start and Stop times can be set to happen each day a program runs OR Start Time can happen only on the Start Date and the Stop Time will happen only on the Stop Date. This setting is called **Cycling Mode** and can be set under the **Settings Sub Menu**. Start and Stop daily is referred to as Periodic and only on Start and Stop Dates is referred to as Continuous. See **Settings Sub Menu** for more information.

Confirm: *OK* or *Cancel*

Screen 3: Enter ON Time. This screen will show a blinking cursor and the time may be entered easily with up to three digits before the decimal place and up to three digits after the decimal. For example, an ON time of three seconds can be entered as 3 followed by pressing the *OK* button. An ON Time of half a second would be entered as 0.5, followed by pressing the *OK* button.

Confirm: *OK* or *Cancel*

Screen 3: Enter OFF Time.

**NOTE: ON and OFF are used throughout the Quasar and it is important to understand their meanings. ON refers to the time the Quasar has the circuit Closed, meaning the current is flowing through the interrupter. OFF refers to the time the Quasar has the circuit Open, meaning the current is not flowing through the interrupter.**

**ON = Closed = Protection**

**OFF = Open = No Protection**

Confirm: *OK* or *Cancel*

After pressing the Confirm: *OK* button, the screen will show confirmation that the program was added and stored to memory. Pressing the OK button again will bring you back to the **Programs Sub Menu**.

After adding a program to memory you will notice that most Sub Menu screens will now show the time until the start of the program at the bottom of the display. When there are more than one programs in memory, the program with the nearest Start Date and Start Time will be displayed. Depending on how far in the future the next program to run is, the time may be displayed with a three digit hour in the format hhh:mm:ss.

### **Upload Programs**

The Model Quasar can sync with other Quasar interrupters via USB cable. The Quasar can be used to sync the clock of non-GPS versions of the Quasar and also to transfer the program data of one Quasar to as many other Quasars as needed. This feature not only saves a lot of time that would otherwise be spent programming, but also removes the possibility of an error in programming on one or more of a group of Quasars that are meant to operate together. The USB cable (supplied) has an "A" and "B" connector at either end. The "A" connector (rectangular) is connected to the Output port of the Quasar and the "B" connector (square) is connected to the Input port of the



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Quasar. The Quasar that does not have anything plugged into its Input, or “B” port is the Controlling unit in the transfer. The ports are located on the inside side panel, in the storage area of the case.

On the Controlling Quasar, Choose #3 in the Programs Sub Menu, Upload Programs. The next screen will ask that you check all connections and press the OK button to start the transfer. Press *OK* or *Cancel*. *Cancel* will take you back to the Programs Sub Menu. *OK* will start the upload (transfer) of the programs. All ten programs will transfer in a few seconds. While the transfer is taking place the screen will show “Sync in progress. . .”. The screen will automatically change to show “Done” when the upload is complete. Press *OK* to return to the Program Sub Menu.

**NOTE: When using the Upload Programs feature, it is important to note that the memory of all Quasars, with the exception of the Controlling unit, will be erased and overwritten.**

### *Manual Cycle Sub Menu*

The Manual Cycle Sub Menu offers two choices:

1. Start Manual Cycle
2. Get In Sync

#### Start Manual Cycle

Start Manual Cycle takes you to a screen where you input the ON and OFF Times. The ON and OFF Times from the last Manual Cycle are kept. Pressing OK starts the interruption cycle with the stored ON and OFF Times, Cancel returns to the Manual Cycle Sub Menu. Pressing the “1” button on the keypad allows you to enter new ON and OFF Time settings.

#### Get In Sync

The Get In Sync feature is meant to be used to add a Quasar to a group of Quasars already interrupting. For example, during a close interval pipe to soil potential survey (CIPS), five Quasars are being used to interrupt rectifiers in the field. These five Quasars have been in operation since Monday and it is now Wednesday afternoon and an additional Quasar needs to be added to the group. Use the Get In Sync feature to add additional Quasars to those already in operation.

To use Get In Sync, the Quasar units to be added must have identical settings to those already in operation. The Quasar will use the program information of when the Start Date and Start Time happened and what the ON and OFF settings are to determine a new, synchronous Start Time will be. When this time occurs, the Quasar will automatically start interrupting, in sync with the other units.

Choose Get In Sync, #2 on the Manual Cycle Sub Menu.

#### Get In Sync Sub Menu

Choose #1, “Choose Program from the list”. This will allow you to view the programs in memory to find a program that should have started in the past or will start in the future to use the Get In Sync feature with.

Choose #2, “Enter New Program” if the Quasar was not previously programmed as those already in operation had been. This will take you through a set of data entry screens similar to the Programming setup previously discussed in this manual. The main difference between these screens and the New Program screens is that now you can use a Start Date and Start Time that have already occurred. In the New Program screens you can only use Start/Stop Date/Times that will occur in the future. When programming the Get In Sync feature, the Stop Date and Stop Time must still occur in the future.

After confirming the ON and OFF times a confirmation screen will appear asking to Start Sync?. OK will begin the countdown to sync, Cancel will take you back to the Get In sync Sub Menu. Once the Quasar begins interrupting, the screen will change to the Interrupting display, as with any active interrupting program.



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### *Settings Sub Menu*

The Settings Sub Menu, #3 from the Main Menu, offers the following options:

1. Time / Position
2. Cycling Settings
3. Battery Status

Choosing #1 from the Settings Sub Menu brings up the GPS Time and Date. This data has been corrected from Universal Time – UTC (formerly known as Greenwich Mean Time – GMT) to display as 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 Quasar 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 Quasar 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 Quasar 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 Quasar does not automatically adjust for Daylight Savings Time (DST). If your time zone uses Daylight Savings Time you can set the Quasar to observe this by pressing #2 from the time / Position Sub menu.

The display screen will show:

Daylight Savings Time

1. on



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### 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 Quasar 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 Quasar 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 Quasar 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 Quasar will begin in the ON or OFF position when interrupting starts.

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

To make a change to the Quasar 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 Quasar interprets the Start Time and Stop Time of a program in memory. Continuous Mode means the Quasar 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 Quasar 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:



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### 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 Quasar allows the user to change the status of the interrupter to be ON or OFF when in Stanby Mode. Standby Mode occurs when the Quasar 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 Quasar is in the ON or Closed 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.

### Battery Status

Pressing #3 from the Setting Sub Menu brings up the battery status display. Battery status will be displayed as a percentage of battery power remaining. Press *OK* to return to the Settings Sub Menu.

## Watchdog

The Model Quasar has a special feature called the *Watchdog* program. The Quasar uses electronic switching devices which require power to operate. These devices do not have the problems of mercury relay switches.

Because the electronic switches used in the Quasar require power, if there is a power outage and the battery becomes fully discharged, the power to these switches will be interrupted and they will return to the normal state, which is OPEN. In order to keep the pipeline or structure from depolarizing, the Quasar has two (2) 9v batteries which will keep the electronic switching devices CLOSED in the event of a main battery failure.

It is important to ensure these 9v batteries are in good condition prior to use, if depolarization is of concern. Conversely, if depolarization is meant to occur, the two (2) 9v batteries powering the Watchdog program should be removed. These batteries are accessed via a removable panel

## Maintenance

The Model Quasar requires very little maintenance for normal operation. The instrument includes an internal 12v battery that requires charging after each use (recommended). The battery is very large and will allow the Quasar to operate up to 40 hours without AC power. Because the battery is so large, recharge time can be equivalent to discharge time. If the Quasar is used on battery for a period of 24 hours, the battery charge time will be up to 24 hours.



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The Quasar also includes a set of two (2) 9v batteries. These batteries power the *Watchdog* program. It is recommended that the two 9v batteries be replaced prior to being put into the field, if the Quasar will be operated from the internal battery only. The *Watchdog* program is not required when the Quasar is operated using AC power. The 9v batteries can be accessed through the removable battery door located on the inside side panel, in the storage compartment of the case.

### Service

If the Quasar 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  
791 S. Waterman Ave.  
San Bernardino, CA 92408

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

[www.tinker-rasor.com](http://www.tinker-rasor.com)

or you can e-mail us:

[Info@tinker-rasor.com](mailto:Info@tinker-rasor.com)

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