

# MATE3

## Owner's Manual Addendum

### Purpose

This document is an addendum to 900-0117-01-00, Revision C of the *MATE3 System Display and Controller Owner's Manual*. It provides descriptions of changes to the MATE3 programming or menus. Many changes are specifically related to the Radian Series Inverter/Chargers. Unless otherwise specified, these changes only apply to the GS7048E inverter model and not the GS8048 model.

### Scope

This document applies to any MATE3 System Display and Controller with firmware numbered 002.010.000 and higher.

### Revision History

- Updated FCC compliance and EMI conformance
- Added items relating to GS7048E and GS8048 inverters
- Added items relating to MATE3 system selections and functions

### Compliance

#### FCC Information to the User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

#### EMI Conformance

The MATE3 has been tested to meet the following standards.

- EN 61000-6-3:2007 +A1:2011 Class B (Conducted Emissions)
- EN 61000-6-4:2007 +A1:2011 Class A (Conducted Emissions)
- EN 61000-6-3:2007+A1:2011 Class B (Radiated Emissions)
- EN 61000-6-3:2008 (Flicker)
- EN 61000-6-1:2007 (ESD, Radiated Immunity, EFT, Surge, Conducted Immunity, Magnetic Field Immunity, Voltage Interruptions, Voltage Dips)

## Inverter Changes

### Operation Chapter (Modified)

Several items depicted in the Operation chapter of the MATE3 manual have changed for the Radian Series Inverter/Charger.

#### Inverter Soft Key (Modified)

In the GS7048E inverter, the **Inverter** soft key screen has added a line titled **In RMS**. The first item displayed is the power factor of the input source. It is followed by the input amperage.

The **Invert** and **Charge** items now appear in the same location. Only one will appear at a time, depending on inverter activity, as shown in Figure 1.

The **Buy** item is replaced with the word **Gen** if the Radian input mode is selected to either **Generator** or **Support**. **Gen** still displays the kilowatts and AC amperage brought into the inverter's input.

Upon pressing the <NEXT> soft key, the MATE3 does not show separate **L1 Phase** and **L2 Phase** screens. The MATE3 proceeds directly to the **Inverter Battery** screen.

Inverting		Inverter		Port 01	
In RMS	0.00 PF	0 A	Battery	26.5 V	
Invert	0.0 kW	13 A	AC Out	119 V	
Load	0.0 kW	0 A	AC In	0 V	
Buy	1.5 kW	13 A	AUX	Off	
Back	Next	Graph	Port		

Charging		Inverter		Port 01	
In RMS	1.00 PF	13 A	Battery	28.5 V	
Charge	3.0 kW	13 A BULK	AC Out	117 V	
Load	0.0 kW	0 A	AC In	118 V	
Buy	1.5 kW	13 A	AUX	Off	
Back	Next	Graph	Port		

**Figure 1 Inverter Soft Key Screen**

#### Warning Messages (Modified)

The **Inverter Warnings** screen soft keys are now labeled <Back>, <Temps>, <GT Limits>, and <Port>. The <GT Limits> soft key opens the screen titled **Grid Tie Warnings**. This change applies to both the GS7048E and the GS8048 inverter models.

For the GS7048E, these warnings are usually accompanied by a disconnection from the utility grid, as well as indicating a failure to sell power.

Inverter Warnings		Port 01	
AC Freq Too High	N	AC Freq Too Low	N
Voltage Too High	N	Voltage Too Low	N
Input Amps > Max	N	Temp Sensor Bad	N
Comm Error	N	Fan Failure	N
Back	Temps	GT Limits	Port

Grid Tie Warnings		Port 01	
AC Freq Too High	N	AC Freq Too Low	N
Voltage Too High	N	Voltage Too Low	N
Back		Port	

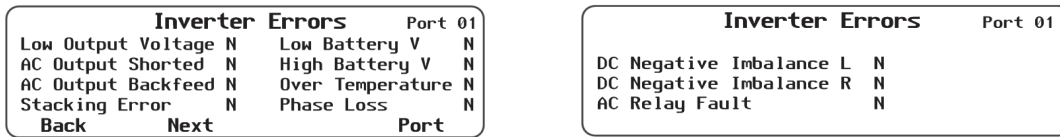
**Figure 2 Warning Messages**

## Error Messages (New)

The **Inverter Errors** screen has added a <Next> soft key which leads to an additional screen. This screen has three additional error messages. In all cases, see the GS7048E *Operator's Manual* for troubleshooting.

**DC NEGATIVE IMBALANCE L** indicates that there is a loose DC connection on the circuit of the left (L) internal power module. **DC NEGATIVE IMBALANCE R** indicates the same problem for the right (R) module. Either will result in uneven current flow between the modules.

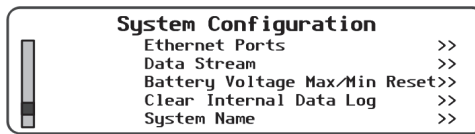
**AC RELAY FAULT** indicates that the internal transfer relay has suffered a mechanical failure.



**Figure 3 Error Messages**

## Programming Chapter: System Settings (Modified)

The System Settings portion of the Programming chapter has been updated. In the **System Configuration** menu, two new screens have been added.



**Figure 4 System Configuration**

## Battery Voltage Min/Max Reset (New)

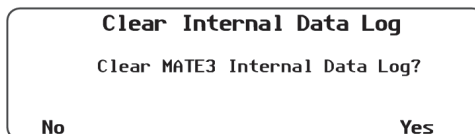
This screen shows the time and date of the highest and lowest battery voltages that have been recorded. The **Reset** key resets these items to the values present at that moment.



**Figure 5 Battery Voltage Min/Max Reset**

## Clear Internal Data Log (New)

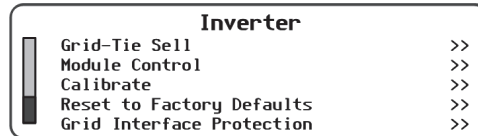
This screen allows the option to clear the internal history of the MATE3. The **Yes** key clears all graph data, Event logs, and similar items.



**Figure 6 Clear Internal Data Log**

## Programming Chapter: Inverter Settings (Modified)

The Inverter Settings portion of the Programming chapter has been updated. One new selection, **Module Control**, has been added for both the GS7048E and the GS8048 models. The selection **Grid Interface Protection** has been added for the GS7048E inverter. The **Grid Interface Protection** option is only visible using the installer password. (See the GS7048E *Operator's Manual*, particularly the section on the **Grid Tied** mode, for more information on password protection.)



**Figure 7 Inverter**

## Auxiliary Output and Auxiliary Relay (Modified)

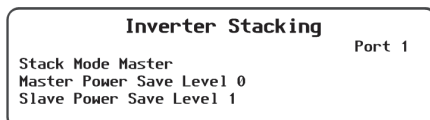
The **Auxiliary Output** and **Auxiliary Relay** menus have one selection that has been changed. In either menu, the function titled **GT Limits** will activate the AUX circuit as an alert that the utility grid does not meet Grid Interface Protection parameters (see page 5) for the grid-interactive function. This function does not have selectable parameters other than those of the **Grid Interface Protection** menu.



**Figure 8 Auxiliary Functions**

## Inverter Stacking (Modified)

The GS7048E has different **Inverter Stacking** options available.



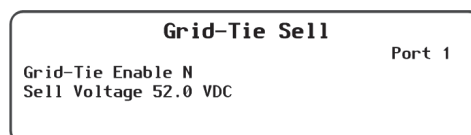
These are the available stacking options.

- **Master** – The primary unit for single-unit systems, single-phase systems, or three-phase systems.
- **Slave** – A secondary unit in a single-phase stacked system.
- **B Phase Master** – A secondary inverter for three-phase systems. Its output is 120° out of phase with other selections.
- **C Phase Master** – A secondary inverter for three-phase systems. Its output is 120° out of phase with other selections.

**Figure 9 Inverter Stacking**

## Grid-Tie Sell (Modified)

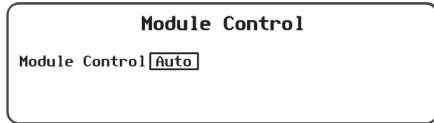
The **Grid-Tie Sell** screen for the GS7048E has only two items available, as shown in Figure 10.



**Figure 10 Grid-Tie Sell**

## Module Control (New)

Control over the inverter's internal modules is usually automatic. If a specific module needs to be selected, the selection can be made on the **Module Control** screen.



These are the available module selections.

- **Auto** – The inverter selects which module to use.
- **Left** – Only the left module operates.
- **Right** – Only the right module operates.
- **Both** – Both modules remain on, regardless of power save settings.

**Figure 11**

### Module Control

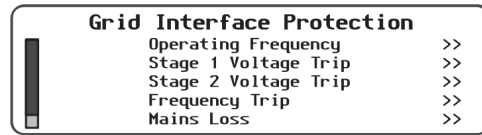
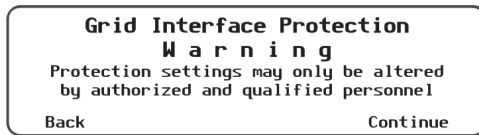
## Grid Interface Protection (New)

This menu has been added to allow additional control over the GS7048E grid-interactive functions. Once **Grid Interface Protection** has been entered, it displays a warning screen before showing available options.



### IMPORTANT:

**Grid Interface Protection** options should only be altered by authorized and qualified personnel. Access has been restricted for this reason.



**Figure 12**      **Grid Interface Protection**

## Operating Frequency (New)

The inverter's operating frequency can be set to one of two nominal values.



Two options are available; **50 Hz** and **60 Hz**.

**Figure 13**      **Operating Frequency**

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## Stage 1 Voltage Trip (New)

This menu adjusts the first set of AC voltage criteria which will cause the GS7048E to disconnect from the source. The criteria are intended for a narrower range of voltages and a longer delay than the Stage 2 menu.

Stage 1 Voltage Trip		Port 1
Over Voltage Clearance Time	1.5 S	
Over Voltage Trip	256 VAC	
Under Voltage Clearance Time	1.5 S	
Under Voltage Trip	208 VAC	

- **Over Voltage Clearance Time** – The time the AC voltage must exceed the **Trip** value before disconnecting.
- **Over Voltage Trip** – The high AC voltage for disconnection.
- **Under Voltage Clearance Time** – The time the AC voltage must drop below the **Trip** value before disconnecting.
- **Under Voltage Trip** – The low AC voltage for disconnection.

**Figure 14 Stage 1 Voltage Trip**

## Stage 2 Voltage Trip (New)

This menu adjusts the second set of AC voltage criteria which will cause the GS7048E to disconnect from the source. The criteria are intended for a wider range of voltages and a shorter delay than the Stage 1 menu.

Stage 2 Voltage Trip		Port 1
Over Voltage Clearance Time	0.2 S	
Over Voltage Trip	264 VAC	
Under Voltage Clearance Time	0.2 S	
Under Voltage Trip	196 VAC	

- **Over Voltage Clearance Time** – The time the AC voltage must exceed the **Trip** value before disconnecting.
- **Over Voltage Trip** – The high voltage limit for disconnection.
- **Under Voltage Clearance Time** – The time the AC voltage must drop below the **Trip** value before disconnecting.
- **Under Voltage Trip** – The low voltage limit for disconnection.

**Figure 15 Stage 2 Voltage Trip**

## Frequency Trip (New)

This menu sets the AC frequency criteria which will cause the GS7048E to disconnect from the source.

Frequency Trip		Port 1
Over Frequency Clearance Time	0.2 S	
Over Frequency Trip	64.0 Hz	
Under Frequency Clearance Time	0.2 S	
Under Frequency Trip	57.0 Hz	

- **Over Frequency Clearance Time** – The time the AC frequency must exceed the **Trip** value before disconnecting.
- **Over Frequency Trip** – The high AC frequency limit for disconnection.
- **Under Frequency Clearance Time** – The time the AC frequency must drop below the **Trip** value before disconnecting.
- **Under Frequency Trip** – The low AC frequency limit for disconnection.

**Figure 16 Frequency Trip**

## Mains Loss (New)

This menu sets the response time for the inverter to disconnect when the AC source is lost. This condition takes effect any time there is risk of an islanding condition.

Mains Loss		Port 1
Clearance Time	2.0 S	
Reconnect Delay	2 S	

- **Clearance Time** – The delay for the inverter to disconnect upon loss of the AC source.
- **Reconnect Delay** – The delay for the inverter to reconnect when the AC source is restored. This is not the same as the delay time for grid-interactive function.

**Figure 17 Mains Loss**

## Programming Chapter: MATE3 Settings (Modified)

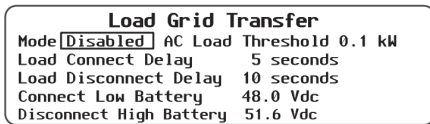
The MATE3 Settings portion of the Programming chapter has been updated. One new screen, *Load Grid Transfer*, has been introduced into the MATE3 section of the *Settings Menu*.



**Figure 18 MATE3**

### Load Grid Transfer (New)

The *Load Grid Transfer* screen, when enabled, sets criteria that cause all inverters to automatically reconnect to the utility grid, even if the normal mode is to be disconnected. Inverters can reconnect based on high output loads, or based on low battery voltage.



These are the available transfer options.

- **Mode – Enabled or Disabled.**
- **AC Load Threshold** – The amount of load which requires the inverter to connect.
- **Load Connect Delay** – The length of time the **AC Load Threshold** must be exceeded before the inverter connects.
- **Load Disconnect Delay** – The length of time the loads must remain below the **AC Load Threshold** before the inverter disconnects from the grid.
- **Connect Low Battery** – The low battery voltage level which requires the inverter to connect.
- **Disconnect High Battery** – The voltage which the batteries must reach before the inverter disconnects from the grid.

**Figure 19 Load Grid Transfer**

## Contact Information

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