



MicroGT 500 Inverter



Owner's Manual

DRAFT



Sensata
Technologies

Thank you from all of us at Sensata Technologies for purchasing this MicroGT 500 inverter. The MicroGT 500 is a product under the Magnum Energy brand from Sensata. We understand there are many purchasing options in the marketplace, and are pleased that you have decided on a Magnum product.

Disclaimer of Liability

The use of this manual and the conditions or methods of installation, operation, use, and maintenance of the MicroGT 500 inverter are beyond the control of Sensata Technologies. Therefore, this company does not assume responsibility and expressly disclaims liability for loss, damage, or expense whether direct, indirect, consequential or incidental that may arise out of or be in any way connected with such installation, operation, use, or maintenance.

Due to continuous improvements and product updates, the images shown in this manual may not exactly match the unit purchased.

Restrictions on Use

The MicroGT 500 inverter may only be used in life support systems with the express written approval of Sensata Technologies. Failure of this inverter can reasonably be expected to cause failure of that life support system, or to affect the safety or effectiveness of that system. If the MicroGT 500 inverter fails, it is reasonable to assume the health of the user or other persons may be endangered.

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Document Information

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This entire manual is available for download—with many of the diagrams available in color—on our website.

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Record unit’s model & serial number in case you need to provide this information in the future.			
Model:		Serial Number:	
<input type="checkbox"/>	MGT500	XX	

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IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions to follow during installation and maintenance of your MicroGT 500 inverter. To reduce the risk of electrical shock and ensure the safe installation and operation of the MicroGT 500, the following symbol appears throughout this document to indicate dangerous conditions and important safety instructions.



WARNING: This indicates a situation where failure to follow instructions may cause a serious hardware failure or personnel danger if not applied appropriately. Use extreme caution when performing this task.

- Do **NOT** disconnect the PV module from the MicroGT 500 inverter without first disconnecting the AC power.
- Only qualified professionals should install and/or replace the MicroGT 500 microinverters.
- All electrical work must be performed in accordance with local, state, and federal electrical codes.
- Before installing or using the MicroGT 500, please read all instructions and cautionary markings in the technical documents and on the MicroGT 500 inverter system and the PV array.
- Be aware that the body of the MicroGT 500 inverter is the heat sink and can reach high temperatures. To reduce risk of burns, do not touch the body of the MicroGT 500.
- Use insulated tools to reduce the chance of electrical shock or accidental short circuits.
- Remove all jewelry such as rings, watches, bracelets, etc., when installing or performing maintenance on the microinverter.
- Always verify proper wiring prior to starting the microinverter.
- Do not operate the microinverter if it has been damaged.
- No AC or DC disconnects are provided as an integral part of this microinverter. **Both AC and DC disconnects must be provided as part of the system installation.**
- No overcurrent protection for the AC output wiring is provided as an integral part of this microinverter. Overcurrent protection of the AC output wiring must be provided as part of the installation.
- Do **NOT** attempt to repair the MicroGT 500 inverter. If it fails, contact Sensata Customer Support (425-353-8833) to obtain an RMA number and to start the replacement process. Damaging or opening the MicroGT 500 inverter will void the warranty.

SAVE THESE INSTRUCTIONS

1.0 Introduction

Congratulations on your purchase of a MicroGT 500 inverter. This microinverter is used in utility-interactive grid-tied applications, and the microinverter system is comprised of two key elements:

1. A MicroGT 500 inverter
2. A MagWeb GT unit

Refer to Figure 1 for an example of a basic system installation diagram using multiple MicroGT 500 microinverters.

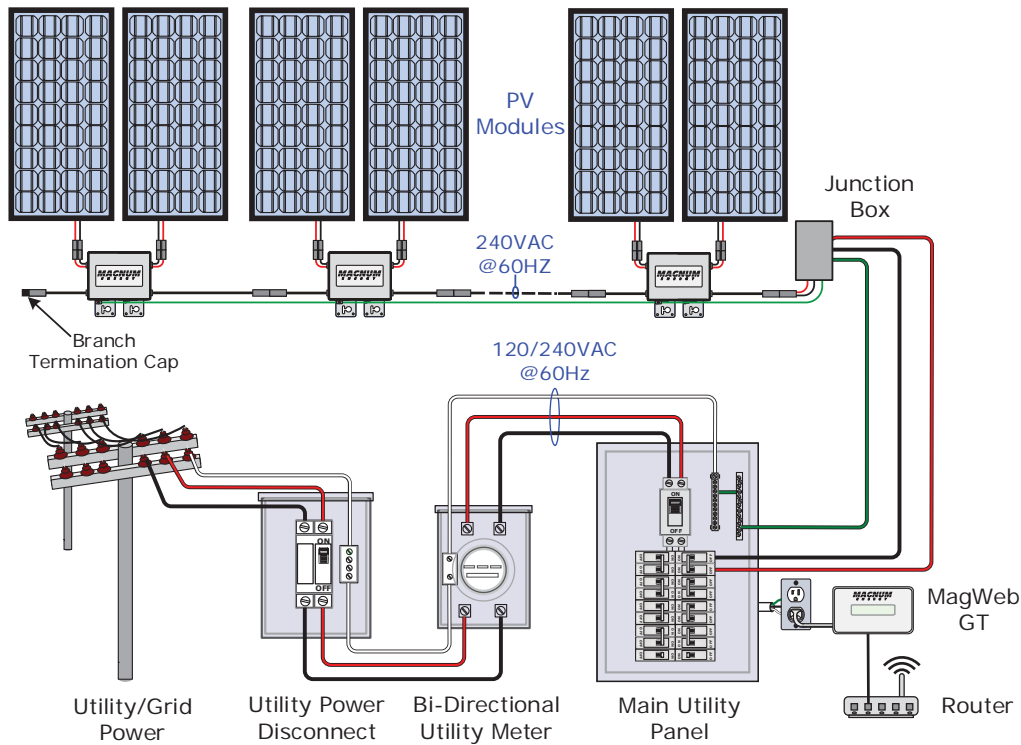


Figure 1, Basic PV System Installation Diagram

MicroGT 500 microinverters maximize PV energy production

Each PV module has individual Maximum Power Point Tracking (MPPT) controls, which ensures that the maximum power is exported to the utility grid regardless of the performance of the other PV modules in the array. When PV modules in the array are affected by shade, dust, orientation, or any situation in which one module underperforms compared with the other units, the MicroGT 500 inverter ensures top performance from the array by maximizing the performance of each module within the array.

More reliable than centralized or string inverters

The distributed MicroGT system ensures no single point of system failure exists across the PV array. MicroGT 500 microinverters are designed to operate at full power at ambient outdoor temperatures of up to 149°F (65°C)—see Appendix B – Efficiency Curves (Figure 11). The microinverter housing is designed for outdoor installation and complies with the NEMA 6 environmental enclosure rating.

2.0 Installation

You can install individual PV modules in any combination of module quantity, orientation, type, and power rate. Refer to Figure 2 for the Micro GT 500's dimensions.

Monitoring and Analysis with the MagWeb GT

The MagWeb GT is the information gateway for your MicroGT 500 inverter system. The MagWeb GT collects module performance data from each individual MicroGT inverter. The MagWeb GT is installed by simply plugging it into any wall outlet and providing an Ethernet or Wi-Fi connection to a broadband router or modem. The software displays performance trends, informs you of abnormal events, and controls system shutdown when it is needed. (See the MagWeb GT manual for instructions.)

The MicroGT 500 inverters connect with the split-phase grid, and operate with most 60 and 72-cell PV modules. For more information, please see the Specifications section in this manual.

MODEL NUMBER	AC GRID	PV MODULE	MODULE CONNECTOR
MicroGT 500	60Hz/240V	60, 72 Cell	MC4 Type or Customize
Maximum MicroGT 500 units per branch:			
Maximum parallel combination of MicroGT 500 modules = x7/branch for 20A breaker (14 PV modules)			

2.1.1 The MicroGT 500's Independent DC Inputs

Each MicroGT 500 inverter has two independent DC inputs, each with independent MPPT control and data monitoring.

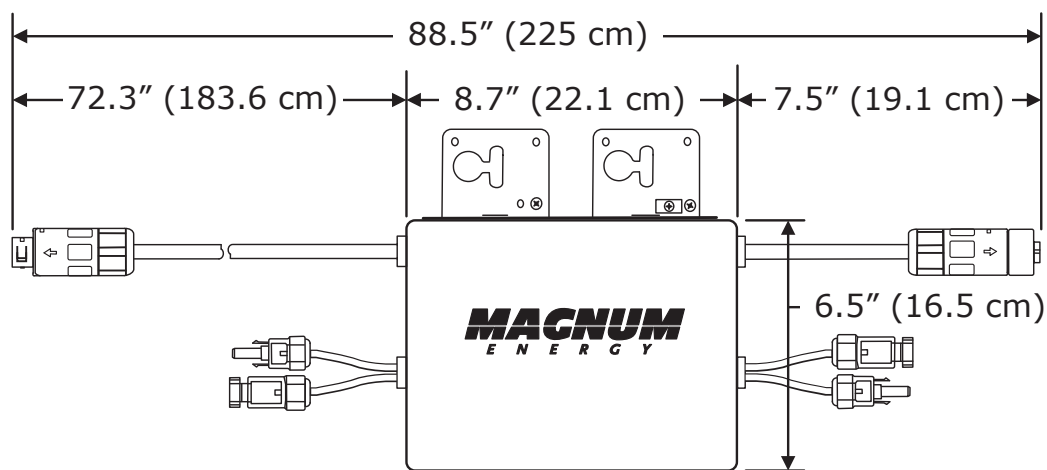


Figure 2, MicroGT 500 Dimensions

A PV system using MicroGT 500 inverters is simple to install (Figure 3). Each MicroGT 500 easily mounts on the PV racking, directly beneath the PV module(s). Low voltage DC wires connect from the PV module directly to the MicroGT 500, eliminating the risk of high DC voltage. Installation MUST comply with local regulations/rules.

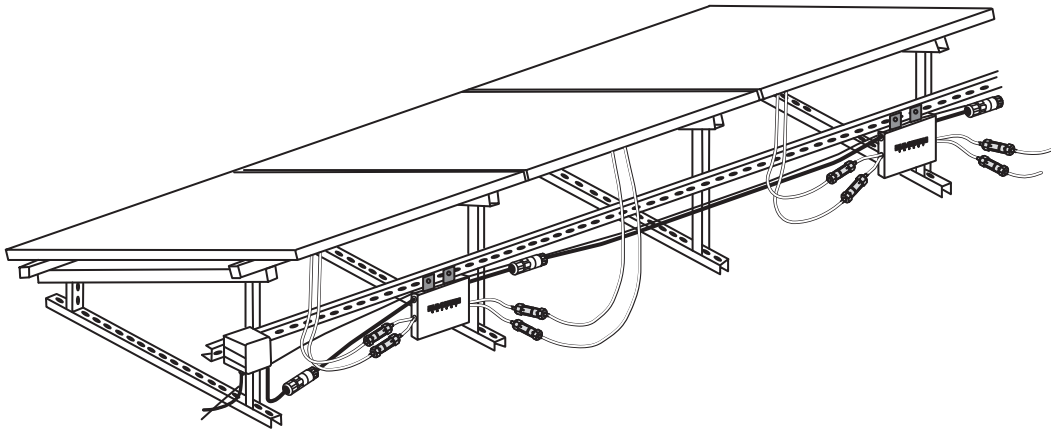


Figure 3, MicroGT 500s in a PV Array



WARNING: Perform all electrical installations in accordance with local electrical codes. Installation of this equipment includes the risk of electric shock. Qualified professionals should install and/or replace MicroGT 500 inverters.



WARNING: Before installing or using a MicroGT 500 inverter, please read all instructions and warnings in the technical documents and on the microinverter system itself, as well as on the PV array.



WARNING: Once the system is connected to the electrical grid, **do not** touch any live parts in the system, including the PV array.

Additional Installation Components to Purchase

- AC connector cable (PN: ME-MGT-AC-F, x1/branch)
- AC extension connector cable (PN: ME-MGT-AC-EXT, if required)
- AC 25A female termination cap (32mm – x1/branch)
- Pair of MC4 caps (male and female)

Required Parts and Tools

In addition to your PV array and its associated hardware, the following tools are required for assembly:

- One AC connection junction box per branch circuit
- Mounting hardware suitable for module racking
- Sockets and wrenches for mounting hardware
- Continuous grounding conductor and grounding washers
- Phillips screwdriver
- Torque wrench

Note: *MicroGT 500 inverters are designed to only operate when they can sense power coming from the grid. Even if they are plugged into the PV array, they will not turn themselves on until they can read power from the grid.*



WARNING: DO NOT connect MicroGT 500 inverters to the utility grid or energize the AC circuit until you have completed all of the installation procedures.

Step 1: Installing the AC Junction Box

First, install and wire an AC branch circuit junction box (Figure 4).

1. Install an appropriate junction box at a suitable location on the PV racking system (typically at the end of a branch of modules).
2. Connect the cables to the AC branch circuit junction box.
 - a. Route the open ends of the AC connector cable and the AC branch circuit cable (from point of utility) in to the junction box. Secure both cables using an appropriate gland/strain relief fitting.
 - b. Connect the AC wires from both cables inside the junction box (L1-RED; L2 - BLACK; NEUTRAL - White).

Note: Be sure to size the AC wire to account for any voltage drop between the AC branch circuit junction box and the point of utility interconnection. See Table 1.

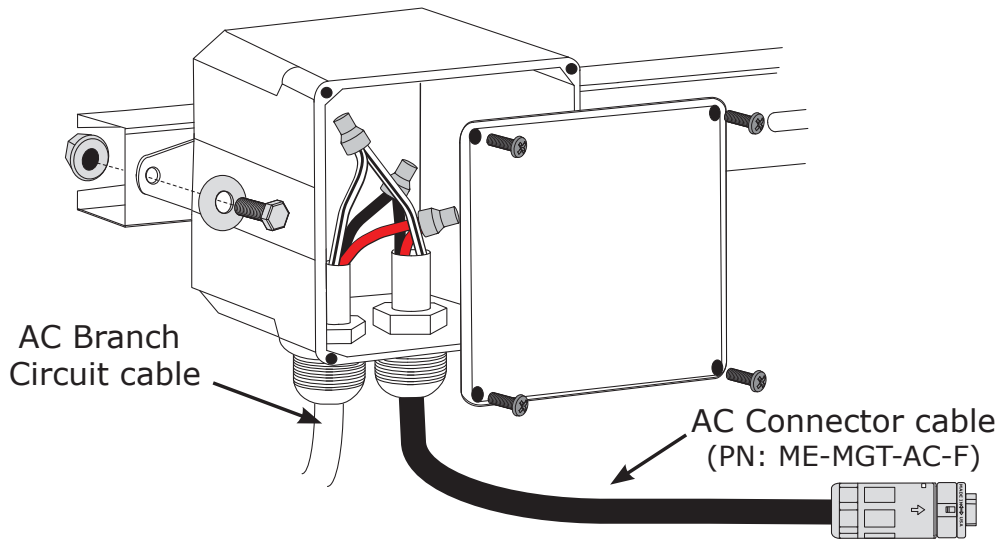


Figure 4, Attaching and Wiring the Junction Box

Table 1, AC Wire Sizes and Lengths

MicroGTs/ Branch	2	3	4	5	6	7*	8	9
External Wire Size	Maximum External Cable Length in Feet (Meters)							
12 AWG (3.3 mm²)	370.7 (113)	237.1 (72)	167.9 (51)	124.3 (38)	93.6 (28)	70.2 (21)	51.4 (16)	35.7 (11)
10 AWG (5.3 mm²)	593.1 (181)	379.4 (116)	268.6 (82)	198.9 (61)	149.7 (46)	112.3 (34)	82.3 (25)	57.1 (17)
8 AWG (8.4 mm²)	926.8 (282)	592.9 (181)	419.6 (128)	310.7 (95)	233.9 (71)	175.5 (54)	128.6 (39)	89.3 (27)
6 AWG (13.3 mm²)	1482.8 (452)	948.6 (289)	671.4 (205)	497.1 (152)	374.3 (114)	280.8 (86)	205.7 (63)	142.9 (44)

*7 is the maximum number/branch with a 20-amp breaker

Step 2: Attaching the MicroGT 500 to PV Frame/Rack

1. Mark the location of each MicroGT 500 inverter on the PV rack—keep in mind the location of the AC branch circuit junction box or any other obstructions.
2. Mount and attach a MicroGT inverter at each of the identified locations using hardware recommended by the PV module racking manufacturer (Figure 5).

Note: If you are using the appropriate grounding washer (check with an electrician), place the grounding washer between the PV racking frame and the MicroGT 500 inverter.



WARNING: Prior to installing any MicroGTs, verify that the utility voltage at the point of common connection matches the voltage rating on the MicroGT inverter's label.



WARNING: Do not mount the MicroGT inverter in a location that allows exposure to direct sunlight. Allow a minimum of 3/4" (1.5 cm) between the roof and the bottom of the MicroGT inverter to allow proper air flow.

Note: Connecting cables (Steps 3-5) can be done in any order, but **DO NOT** energize until the steps are completed.

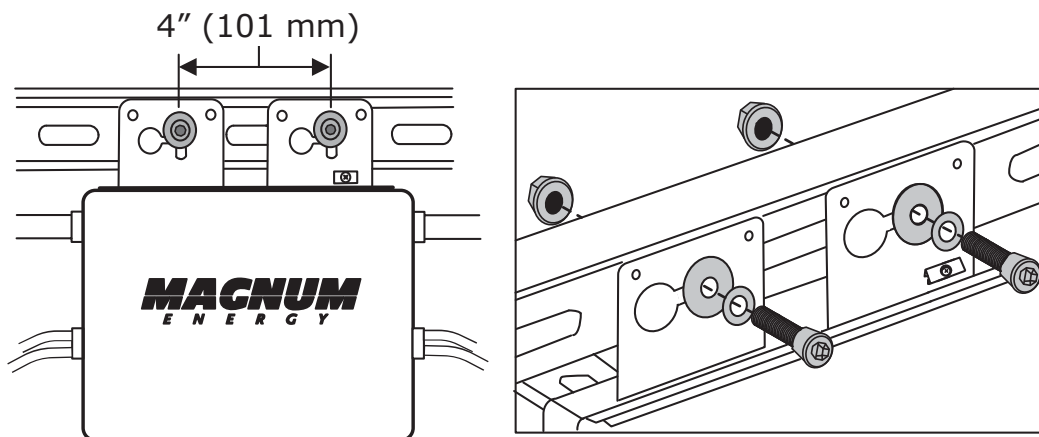
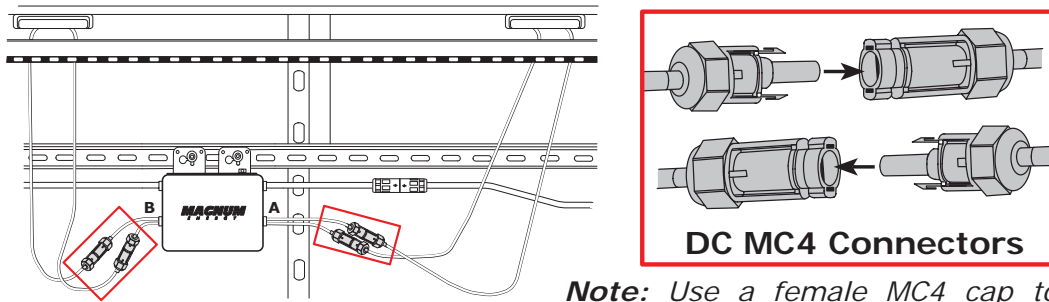


Figure 5, Attaching MicroGTs to the PV Module Frame

Step 3: Connecting MicroGTs to the PV Module

Use Figure 6 when connecting the DC cables from the PV modules to the MicroGT 500 inverters.



Note: Use a female MC4 cap to cover/protect an unused male AC connector, and vice versa.

Figure 6, Connecting MicroGTs to the PV Modules

Note: Upon connecting the DC cables, the MicroGT 500 inverter's LED (on bottom of unit) should immediately blink red, then green three times—indicating that the MicroGT inverter is functioning correctly. This test function starts and ends within 5 seconds of plugging in the unit, so pay careful attention to these lights when connecting the DC cables. This only occurs when DC voltage is first applied. The LED will not flash when the second panel is corrected.



WARNING: Ensure that all AC and DC wiring is correct. Check that none of the AC and DC wires are pinched or damaged. Be sure all the junction boxes are properly closed.

Step 4: Grounding the System

Each MicroGT 500 inverter comes with a ground clamp that can accommodate a single #6 AWG (13.3 mm²) strand and #4 AWG (21.1 mm²) solid conductor. Check your local electrical code for grounding conductor sizing requirements.

Note: If you used grounding washers (WEEB) to ground the MicroGT 500's chassis to the PV racking—per Note in Step 2—skip this step.

1. Connect the grounding electrode conductor to the MicroGT 500 inverter ground clamp (Figure 7).

Note: The AC output neutral is not bonded to ground inside the MicroGT 500 inverter.

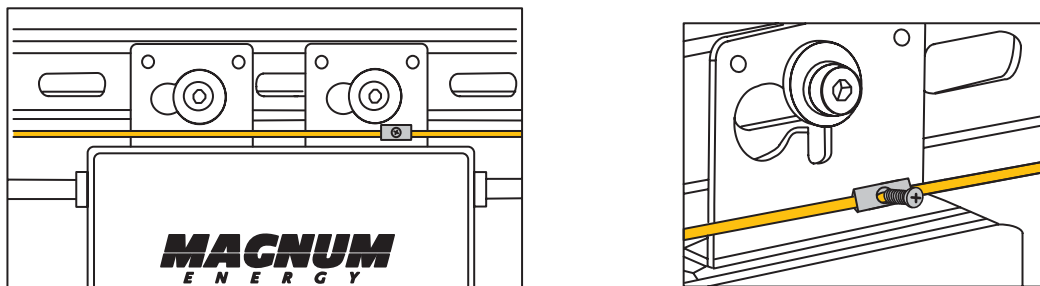


Figure 7, Grounding the System using the Grounding Clamp

Installation

Step 5: Connecting the MicroGTs using AC Connectors

The MicroGT 500 inverter's datasheet states the maximum allowable number of microinverters on one AC branch circuit is seven.



WARNING: DO NOT exceed the maximum number of microinverters in an AC branch circuit—as displayed on the unit's label.

Note: You may need to supply an AC Extension Connector cable (ME-MGT-AC-EXT) if the microinverters on the same branch circuit are greater than 6 feet apart.

1. Plug the female AC connector of the first MicroGT inverter into the male connector of the next microinverter (Figure 8), and so on, to form a continuous AC branch circuit.
2. Install a protective end cap on the open AC connector of the last microinverter in the AC branch circuit (Figure 9).

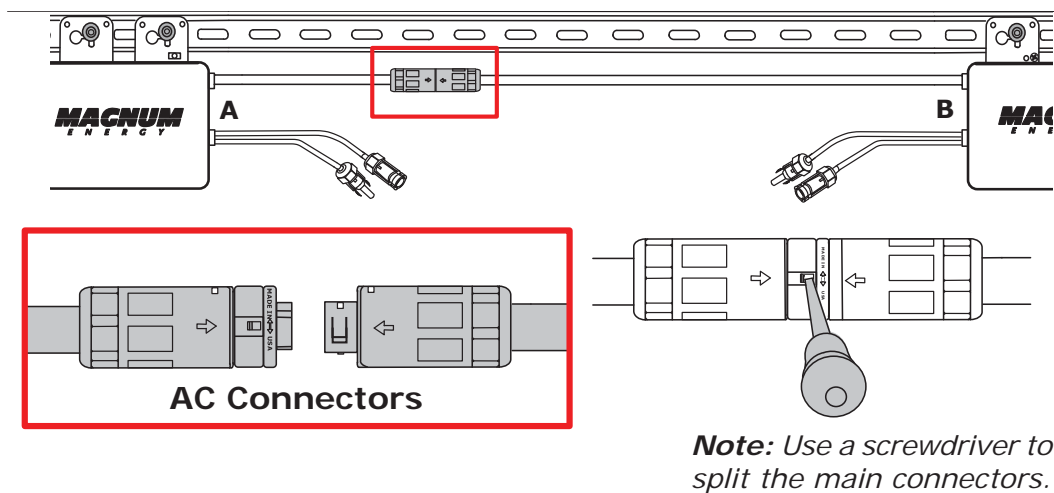


Figure 8, Connecting the MicroGTs via AC Connectors

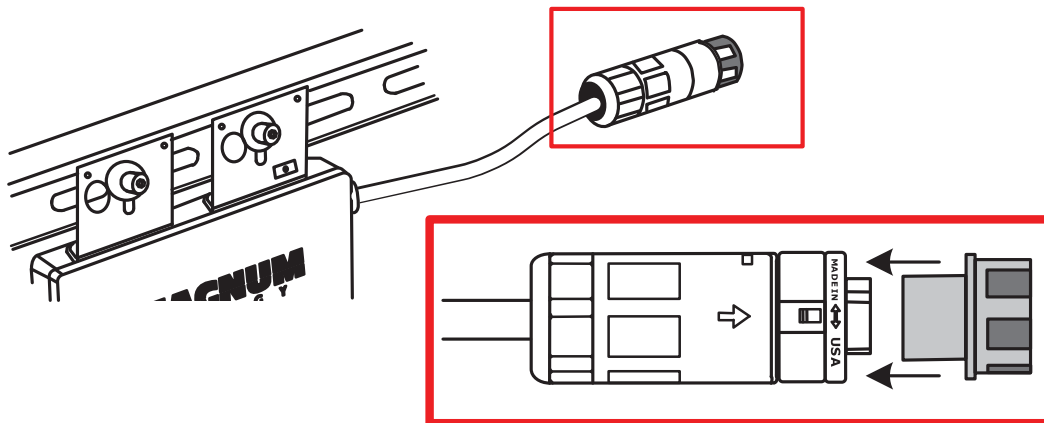


Figure 9, AC Connector Protective End Cap

Step 6: Completing Installation of MicroGT 500s

Complete the MicroGT 500 inverter registration cards, which provide system information and the installation map. The layout map provided is designed to accommodate labels in vertical or horizontal orientation to meet all field PV configurations.

1. Each MicroGT 500 inverter has a serial number label on the back side (Figure 10). Peel each label off, affix it to the respective location on the microinverter system installation map.
2. Fill out the warranty cards. The warranty cards and installation map are needed to register the site in the EMA.
3. Complete the EMA Installer Account Registration form found on our website (SensataPower.com). Sensata will create the EMA account and email you the account information. You can use the EMA website to view detailed performance data for your PV system.

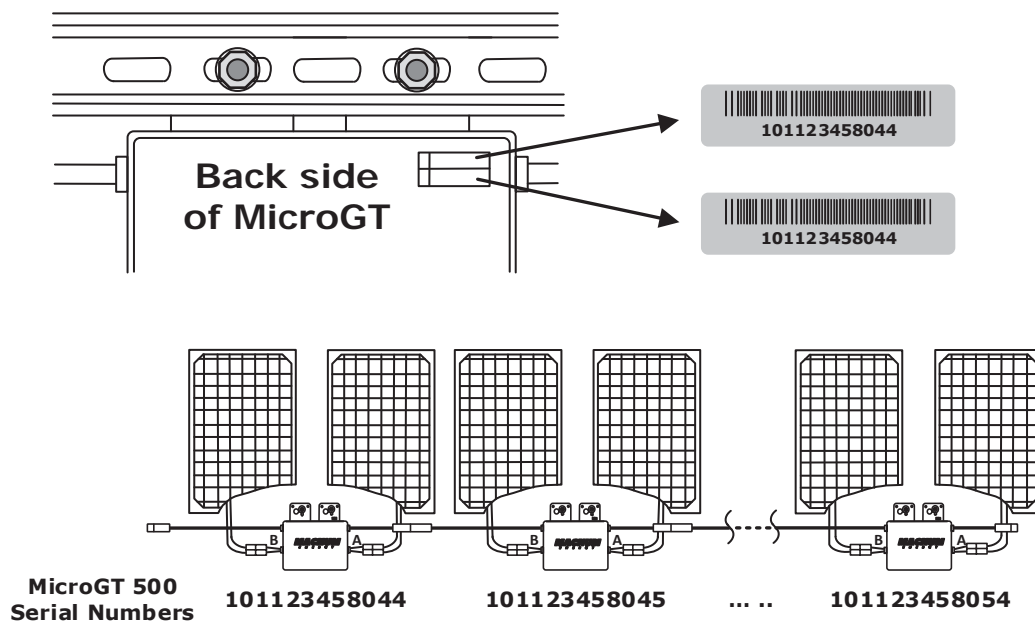


Figure 10, MicroGT Inverter Serial Numbers

3.0 Operation

Operating a Basic MicroGT 500 PV System

To operate a batteryless MicroGT 500 inverter PV system:

1. Turn on the AC circuit breaker on each MicroGT inverter branch circuit.
2. Turn on the main utility grid AC circuit breaker. Your system will start producing power after a five-minute wait time.

Note: *Five minutes after turning on the AC circuit breaker, the units' LEDs should start blinking green every 2 seconds. This means they are producing power normally, but have not yet connected to the MagWeb GT.*

3. Plug in the MagWeb GT and follow instructions per your MagWeb GT Owner's Manual.

Once the MagWeb GT has been plugged in and acknowledges the MicroGT inverters, the microinverters will start to blink every 10 seconds.

Note: *The time required for all microinverters in the system to report to the MagWeb GT will vary with the number of microinverters in the system. Once communications have been established between the MagWeb GT and the microinverters, the microinverters will start to send performance data over power line to the MagWeb GT. You can verify the proper operation of the MicroGT inverters via the MagWeb GT.*

Refer to the MagWeb GT Owner's Manual for more information on its operation.

4.0 Troubleshooting

If your PV system does not operate properly, qualified personnel might correct the situation using the troubleshooting info below.

Status Indications and Error Reporting

The LED on the bottom of the MicroGT assists with troubleshooting.

Start up LED:

A quick red blink followed by three short green blinks when DC power is first applied to the MicroGT indicates a successful startup.

Operation LED:

Flashing Slow Green (10 sec. interval) – producing power and communicating with the MagWeb GT.

Flashing Fast Green (2 sec. interval) – producing power, but not communicating with MagWeb GT.

Flashing Red – not producing power.

GFDI Error:

A solid red LED indicates the MicroGT 500 has detected a DC voltage Ground Fault Detector Interrupter (GFDI) error in the PV system. Unless the GFDI error has been cleared, the LED will remain red and the MagWeb GT will keep reporting the fault. After the ground fault error is fixed, follow the instructions in the MagWeb GT Owner's Manual to clear this GFDI error.

Other Faults:

Other faults are reported to the MagWeb GT. Refer to the MagWeb GT Owner's Manual for other faults and troubleshooting procedures.



WARNING: Only qualified personnel should directly handle the MicroGT 500 inverter.



WARNING: Never disconnect the DC wire connectors under load. Ensure that no current is flowing in the DC wires prior to disconnecting.



WARNING: Always disconnect AC power before disconnecting the PV module wires from the MicroGT inverter. Either disconnecting the appropriate AC circuit breaker or unplugging the first AC connector of the first microinverter in a branch circuit is suitable as a means of disconnection.



WARNING: The MicroGT inverter is powered by PV module DC power. AFTER disconnecting the DC power—when reconnecting the PV modules to the microinverter—be sure to watch for the four short LED flashes (x1 red, x3 green).

A Non-operating Micro GT Inverter

There are two possible overall areas of trouble:

- The MicroGT inverter may be having problems, or
- The MicroGT inverter is working fine, but it is having trouble communicating with the MagWeb GT.

Troubleshooting

The items below refer to MicroGT inverter issues, not communication issues (addressed in the MagWeb GT manual). A quick way to tell whether the issue is the microinverter or a communication problem with the MagWeb GT:

- A. Diagnosing from the microinverter:** A red light – either blinking or solid on the microinverter, or no light at all. No light, or a red light, means it is more than likely a microinverter problem.
- B. Diagnosing from the MagWeb GT:**
 - a. *No-data-display:* This is probably a communication issue, not a microinverter problem.
 - b. *Problems with erratic display:* Data is displayed for some period and then no data is displayed—most likely a communication issue.
 - c. *0 watts, or 2 watts:* Possibly a microinverter problem.
 - d. *Erratic data display that is not coordinating with data displays from other units:* most likely a microinverter problem.

Troubleshooting a Non-operating MicroGT Inverter

1. Verify the utility voltage and frequency are within the ranges shown in the Specifications section of this manual.
2. Check the connection to the utility grid. Verify utility power is present at the inverter in question by removing AC, then DC power. Never disconnect the DC wires while the microinverter is producing power. Re-connect the DC module connectors and watch for one red followed by three short green LED flashes.
3. Check the AC branch circuit interconnection between all the microinverters. In rare cases, the wire in the AC plug may have worked loose. This will need to be reviewed by a qualified electrician. Verify that each inverter is energized by the utility grid as described in the previous step.
4. Make sure that all AC breakers are functioning properly and are closed.
5. Check the DC connections between the microinverter and the PV module.
6. Verify that the PV module DC voltage is within the allowable range shown in the Specifications section of this manual.
7. If the problem persists, please call Sensata Customer Support at 425-353-8833.



WARNING: Do not attempt to repair the MicroGT 500 inverter. If troubleshooting methods fail, please contact Sensata Customer Service at 425-353-8833 for a Return Merchandise Authorization (RMA).

Replacing a Non-operational MicroGT 500 Inverter

1. Disconnect the MicroGT inverter from the PV module, in the order below:
 - a) Disconnect the AC by turning off the branch circuit breaker.
 - b) Disconnect the AC connector(s) from the adjacent inverter(s) in the branch circuit.
 - c) Disconnect the PV module DC MC4 wire connector from the microinverter to be replaced.
 - d) Remove the MicroGT inverter from the PV array.
2. Install a replacement MicroGT inverter to the rack. Remember to observe the flashing LED light as soon as the new microinverter is connected to the DC PV module cables.
3. Connect the AC cable of the replacement MicroGT inverter and the neighboring microinverter to complete the branch circuit connections.
4. Close the branch circuit breaker, and then verify operation of the replacement microinverter.



WARNING: Be sure to verify that the voltage and current specifications of your PV module match those of the microinverter.



WARNING: You must match the DC operating voltage range of the PV module with the allowable input voltage range of the MicroGT inverter.



WARNING: The maximum open circuit voltage of the PV module must not exceed the specified maximum input voltage of the MicroGT inverter.

Appendix A – Specifications

MicroGT 500 Specifications

Models	MicroGT 500
Input Data (DC)	
Recommended PV Module Power (STC) Range	180 - 310W
MPPT Voltage Range	22 - 45V
Operation Voltage Range	16 - 52V
Maximum Input Voltage	55V
Startup Voltage	22V
Maximum Input Current	12A (x2)
Output Data (AC)	
Nominal Output Voltage	240V
Maximum Continuous Output Power	500W
Nominal Output Current	2.08A
Default Output Voltage Range	211 - 264V*
Maximum Output Fault Current (Peak)	54.8A
Maximum Output Fault Current (RMS)	4.85A
Maximum Output Fault Current Duration	1.639ms
Reactive Current	0.1A
Extended Output Voltage Range	181 - 298V
Nominal Output Frequency	60Hz
Default Output Frequency Range	59.3 - 60.5Hz*
Extended Output Frequency Range	55.1 - 64.9Hz
Power Factor	>0.99
Total Harmonic Distortion	<3%
Maximum Units per Branch	7 for 20A breaker**
Efficiency	
Peak Efficiency	95.5%
CEC Weighted Efficiency	95%
Nominal MPPT Efficiency	99.5%
Night Power Consumption	120mW
Mechanical Data	
Operating Ambient Temperature Range	-40°F to +149°F (-40°C to +65°C)
Operating Internal Temperature Range	-40°F to +185°F (-40°C to +85°C)
Storage Temperature Range	-40°F to +185°F (-40°C to +85°C)
Dimensions (W x H x D)	8.7" X 6.5" X 1.1" (22cm X 17cm X 3cm)
Weight	5.5lbs/2.5kg
AC Bus	12 AWG
Enclosure Rating	NEMA 6
Cooling	Natural Convection

MicroGT 500 Specifications (Cont.)

Features & Compliance	
Communication	Power Line (PLC)
Design Lifetime	25 yrs
Emissions & Immunity (EMC) Compliance	FCC Part15; ANSI C63.4; ICES-003
Monitoring	Life monitoring via software
Safety Class Compliance	UL1741, CSA C22.2 No. 107.1-01, NEC2014 690.12
Grid Connection Compliance	IEEE1547

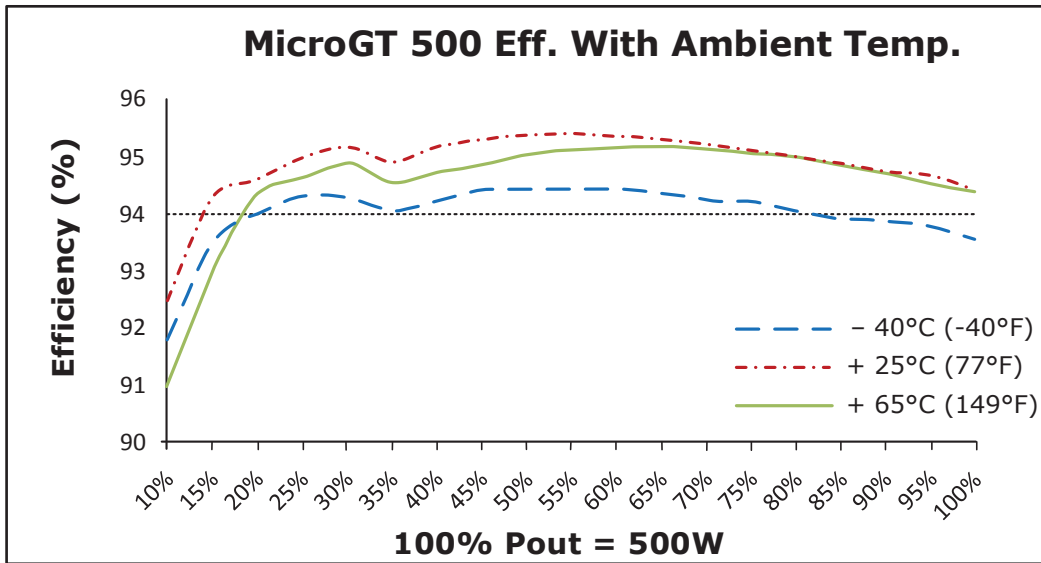
* Programmable through the MagWeb GT to meet customer need.

** Dependent on local regulations.

Specifications @ 25°C – Subject to change without notice.

Appendix B – Efficiency Curves

MicroGT 500 Efficiency-Temperature Curves



MicroGT 500 Efficiency Curves

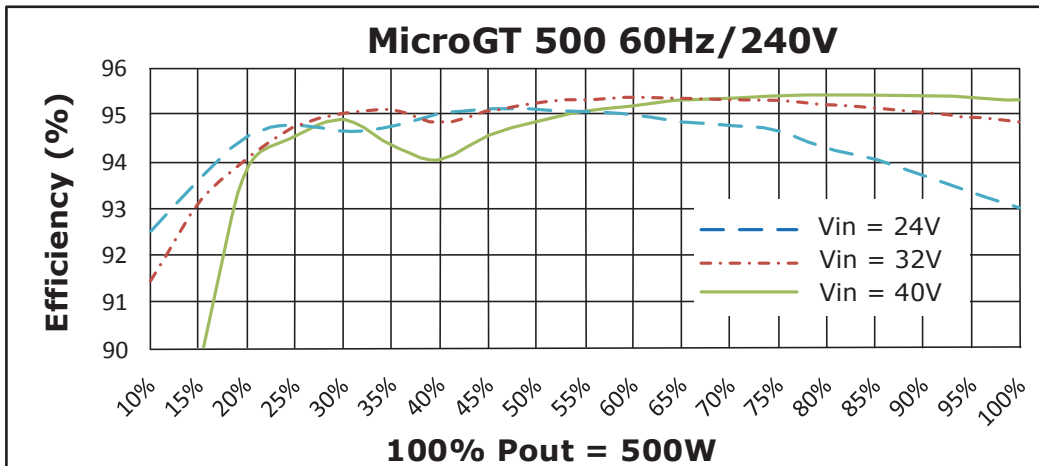


Figure 11, MicroGT Inverter Efficiency Curves

Appendix C – Radio Interference Statement

FCC compliance: The equipment complies with the limits for a Class B digital device, pursuant to Part 15 of FCC rules, which are designed to protect against harmful interference in a residential installation. The equipment could radiate radio frequency energy, and this might cause harmful interference to radio communications if instructions were not followed when installing and using the equipment. But there is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, the following measures might resolve the issues:

- A) Relocate the receiving antenna and keep it well away from the equipment.
- B) Consult the dealer or an experienced radio/TV technician for assistance.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

Appendix D – Installing Battery-based Inverters

MicroGT 500 microinverters are specifically designed to communicate with Magnum inverters in a battery backed inverter system.

Installing a MicroGT 500 PV System with Sub-Panel

Adding a sub-panel to your basic PV system (Figure 12) allows you to continue to power essential loads during utility outages, and it allows for an easy transition to an AC coupled system (adding a battery-based inverter system between the main and sub panels).

Note: *The instructions for installing a MicroGT PV system with a sub-panel are identical to those for installing the basic PV system in the previous Installation section (except for Step 2a). Refer to those instructions for additional info and cautions during installation.*

To install a MicroGT 500 PV system with a sub-panel:

1. Install an appropriate junction box at a suitable location on the PV racking system (typically at the end of a branch of modules).
2. Connect the cables to the AC branch circuit junction box.
 - a. Route the open ends of the AC connector cable and the AC branch circuit cable (from point of utility through the sub-panel per Figure 12) in to the junction box. Secure both cables using an appropriate gland/strain relief fitting.
 - b. Connect the AC wires from both cables inside the junction box (L1-RED; L2 - BLACK; NEUTRAL - White; see Figure 4).

Note: *Be sure to size the AC wire to account for any voltage drop between the AC branch circuit junction box and the point of utility interconnection. See Table 1.*
3. Mark the location of each MicroGT 500 inverter on the PV rack—keep in mind the location of the AC branch circuit junction box or any other obstructions.
4. Mount and attach a MicroGT inverter at each of the identified locations using hardware recommended by the PV module racking manufacturer (Figure 5).
5. Connect the DC cables from the PV modules to the MicroGT 500 microinverters using the MC4 connectors (Figure 6).
6. Connect the grounding electrode conductor to the MicroGT 500's ground clamp (Figure 7).
7. Plug the female AC connector of the first MicroGT inverter into the male connector of the next microinverter (Figure 8), and so on, to form a continuous AC branch circuit.
8. Install a protective end cap on the open AC connector of the last microinverter in the AC branch circuit (Figure 9).

Refer to the Operation section in this manual for info on connecting the MagWeb GT and activating your MicroGT PV system with a sub-panel.

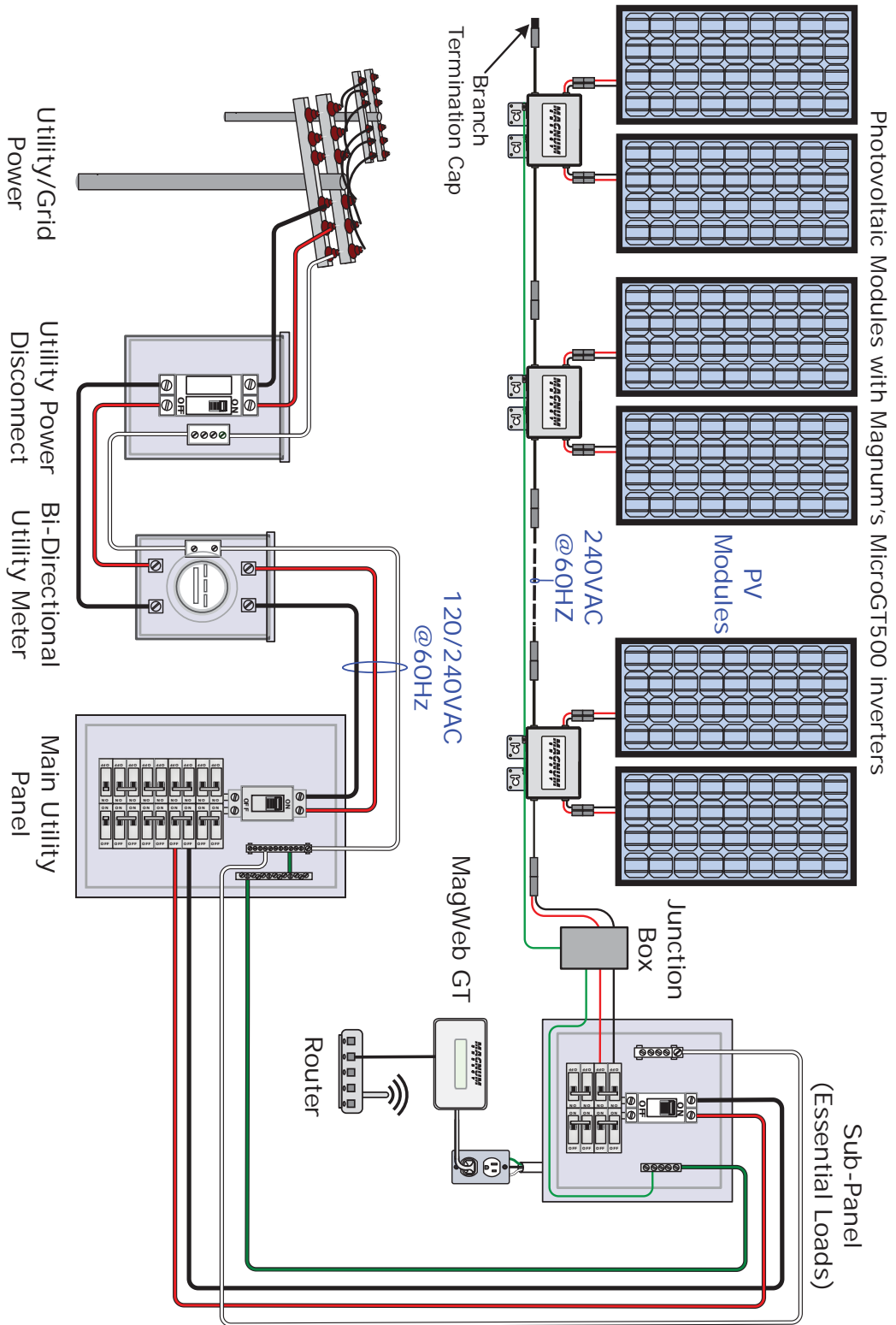


Figure 12, PV System Installation Diagram (w/ Sub-Panel)

Installing a MicroGT AC Coupled PV System

AC coupling is the ability to connect the inverter's AC input and output circuits in parallel, and to use utility power to continue to power loads and charge the batteries from the AC side.

Creating an AC Coupled System

In a basic PV installation, a battery-less, grid-tie microinverter system utilizes renewable energy to offset power consumption from the utility grid. However, with that system, the grid-tie microinverters must shut down during a utility power outage. Thus, your critical loads are no longer powered, and all the energy produced by your PV system during the outage is wasted.

In an AC coupled system, all the energy sources and loads are connected directly to the AC side (Figure 13). Installing a bi-directional battery-based inverter (i.e., Magnum Energy's MS-PAE Series) allows the existing battery-less, grid-tie microinverters to operate, and therefore to continue to utilize the renewable energy from your PV system to power the home's critical loads during the power outage—all from the AC side. The MS-PAE Series inverter (\geq Rev. 4.1) has a feature ("frequency shift") that can be enabled with an optional remote control (ME-RTR, ME-ARC, or ME-RC); this feature allows the AC output frequency to shift when excess power is generated on the AC side.

Note: Refer also to the instructions in the Installation section for additional info and cautions during installation.

To install a MicroGT 500 AC Coupled PV system:

1. Mark the location of each MicroGT 500 inverter on the PV rack.
2. Mount and attach a MicroGT inverter at each of the identified locations using hardware recommended by the PV module racking manufacturer (Figure 5).
3. Connect the DC cables from the PV modules to the MicroGT 500 microinverters using the MC4 connectors (Figure 6).
4. Connect the grounding electrode conductors to the MicroGT 500s' ground clamps (Figure 7).
5. Plug the female AC connector of the first MicroGT inverter into the male connector of the next microinverter (Figure 8), and so on, to form a continuous AC branch circuit.
6. Install a protective end cap on the open AC connector of the last microinverter in the AC branch circuit (Figure 9).
7. Route the open ends of the AC connector cable and the AC branch circuit cable in to the sub panel. Secure both cables using an appropriate gland/strain relief fitting.
8. Route and connect the sub panel to your Magnum MS-PAE inverter using appropriate wiring.
9. Route and connect the your Magnum MS-PAE inverter to the main utility panel using appropriate wiring.

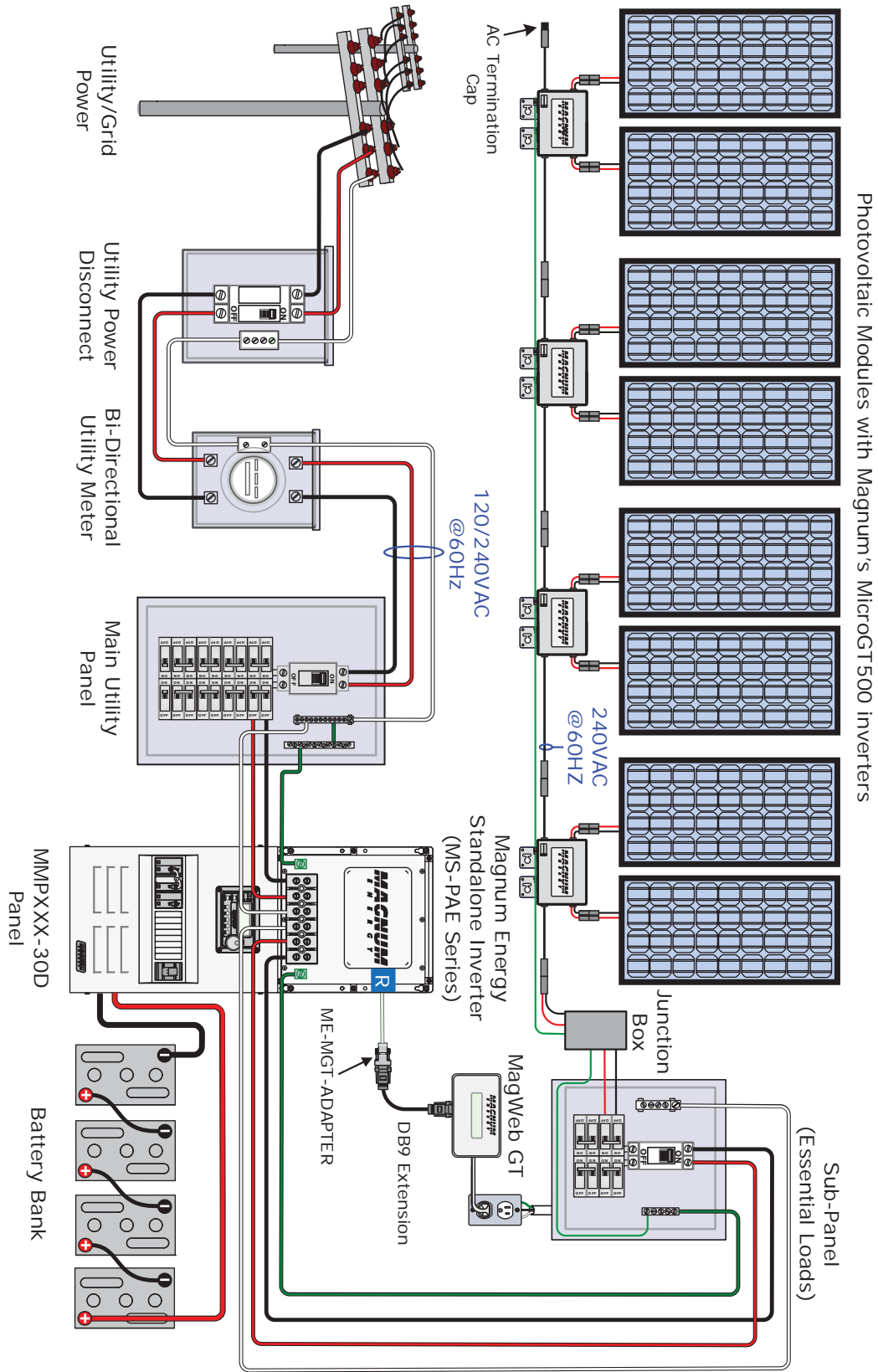


Figure 13, AC Coupled PV System Installation Diagram

Appendix E – Warranty & Service Information

Limited Warranty

Sensata Technologies warrants the MicroGT 500 inverter to be free from defects in material and workmanship that result in product failure during normal usage, according to the following terms and conditions:

1. The limited warranty for the product extends for 10 years—beginning from the product’s original date of purchase.
2. The limited warranty extends to the original purchaser of the product and is not assignable or transferable to any subsequent purchaser.
3. During the limited warranty period, Sensata will replace the MicroGT microinverter at our option if such replacement is needed because of product malfunction or failure during normal usage. The limited warranty does not cover defects in appearance (cosmetic or decorative), or any structural or non-operative parts. Sensata’s limit of liability under the limited warranty shall be the actual cash value of the product at the time the original purchaser returns the product, determined by the price paid by the original purchaser. Sensata shall not be liable for any other losses or damages.
4. Upon request from Sensata Technologies, the original purchaser must prove the product’s original date of purchase by a dated bill of sale, itemized receipt.
5. The original purchaser shall return the product prepaid to Sensata, or to one of Sensata’s Authorized Service Centers (ASC). A replacement product will be returned prepaid to the original purchaser via a non-expedited surface freight within the contiguous U.S. and Canada; this excludes Alaska and Hawaii.
6. If Sensata replaces a product, its warranty continues for the remaining portion of the original warranty period or 90 days from the date of the return shipment to the original purchaser, whichever is greater. All replaced products become the property of Sensata Technologies.
7. This limited warranty is voided if:
 - the product has been modified without authorization
 - the serial number has been altered or removed
 - the product has been damaged through abuse, neglect, accident, high voltage, or corrosion
 - the product was not installed and operated according to the owner’s manual

**A RETURN MATERIAL AUTHORIZATION (RMA) NUMBER IS
REQUIRED BEFORE RETURNING ANY PRODUCT**

How to Receive Repair Service

If your product requires warranty replacement, contact either:

- An authorized service center, at www.SensataPower.com, or,
- Sensata Technologies at:

Telephone: 425-353-8833

Fax: 425-353-8390

Email: MagnumWarranty@Sensata.com

If returning your product directly to Sensata for repair, you must:

1. Return the unit in the original, or equivalent, shipping container.
2. Receive a Return Materials Authorization (RMA) number from the factory prior to returning the product to Sensata for repair.
3. Place the RMA numbers clearly on the shipping container or on the packing slip.

When sending your product for service, please ensure it is properly packaged. **Damage due to inadequate packaging is not covered under warranty.** We recommend sending the product by traceable or insured service.



DRAFT

Magnum Energy Products

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MicroGT 500 Owner's Manual (PN: 64-0085 Rev A)