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INSTALLATION AND SAFETY MANUAL FOR TIGO ENERGY® MODULE MAXIMIZER™ ES, 2ES, J-ES

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Check out our new installation video
www.tigoenergy.com/support

PLEASE READ THIS FIRST

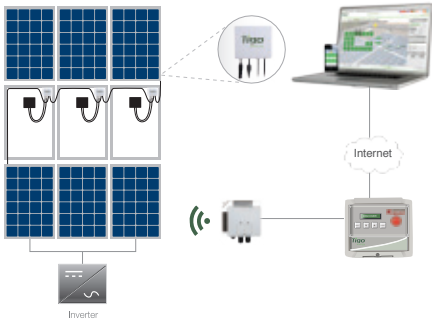
IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

LETHAL VOLTAGE MAY BE PRESENT IN ANY PV INSTALLATION

- This manual contains important instructions for installation and maintenance of the Tigo Energy® product models MM-ES-050V300W, MM-ES075V350W, MM-ES110V300W, MM-ES-170V300W, MM-2ES050V300W, MM-2ES075V350W, MMJ-ES050V300W, HBF-ES050300W, ES-GTWY-020, MMU-ES, and related Tigo Energy software applications.
- Risk of electric shock, do not remove cover, disassemble, or repair, no user serviceable parts inside. Refer servicing to qualified service personnel.
- Before installing or using the Tigo Energy® Maximizer™ System, please read all instructions and warning markings on the Tigo Energy products, appropriate sections of your inverter manual, photovoltaic (PV) module installation manual, and other available safety guides.
- Failure to adhere to these instructions may result in injury or death, damage to the system or voiding the factory warranty.
- To reduce risk of fire and shock hazard, install this device with strict adherence to National Electric Code (NEC) ANSI/NFPA 70 and/or local electrical codes. When the photovoltaic array is exposed to light, it supplies a DC voltage to the Tigo Energy® Module Maximizer™. The Module Maximizer starts in the “ON” state and its output voltage may be as high as the PV module open circuit voltage (Voc) when connected to the module. The installer should use the same caution when handling electrical cables from a PV module with or without the Tigo Energy Module Maximizer attached.
- Installation must be performed by trained professionals only. Tigo Energy does not assume liability for loss or damage resulting from improper handling, installation, or misuse of products.
- Remove all metallic jewelry prior to installing the Tigo Energy Module Maximizer to reduce the risk of contacting live circuitry. Do not attempt to install in inclement weather.
- Do not operate the Tigo Energy Module Maximizer if it has been physically damaged. Check existing cables and connectors, ensuring they are in good condition and appropriate in rating. Do not operate the Tigo Energy Module Maximizer with damaged or substandard wiring or connectors. Tigo Energy Module Maximizer must be mounted on the high end of the PV module back-sheet or racking system, and in any case above ground.
- Do not connect or disconnect under load. Turning off the Inverter and/or the Tigo Energy products may not reduce this risk. Internal capacitors within the inverter can remain charged for several minutes after disconnecting all power sources. Verify capacitors have discharged by measuring voltage across inverter terminals prior to disconnecting wiring if service is required.
- Service Personnel: Check the voltage of the array after activating the Tigo Energy® PV-Safe™ function on the MMU prior to performing service.
- Always assume Module Maximizer is in “ON” state, or may turn on when restarting.

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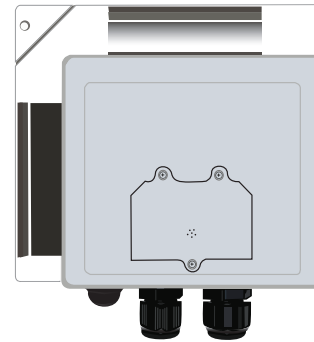
1. System Overview



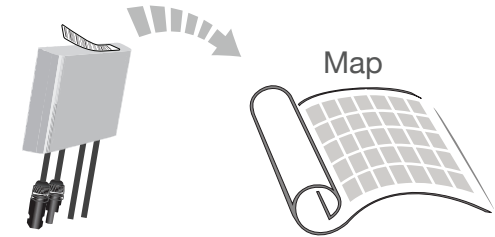
2. Installing Management Unit (MMU)



3. Installing Gateways (GTWY)



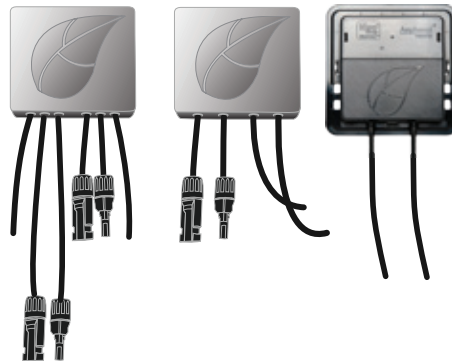
4. Mapping



5. Configuring the System Online



6. Installing Maximizers



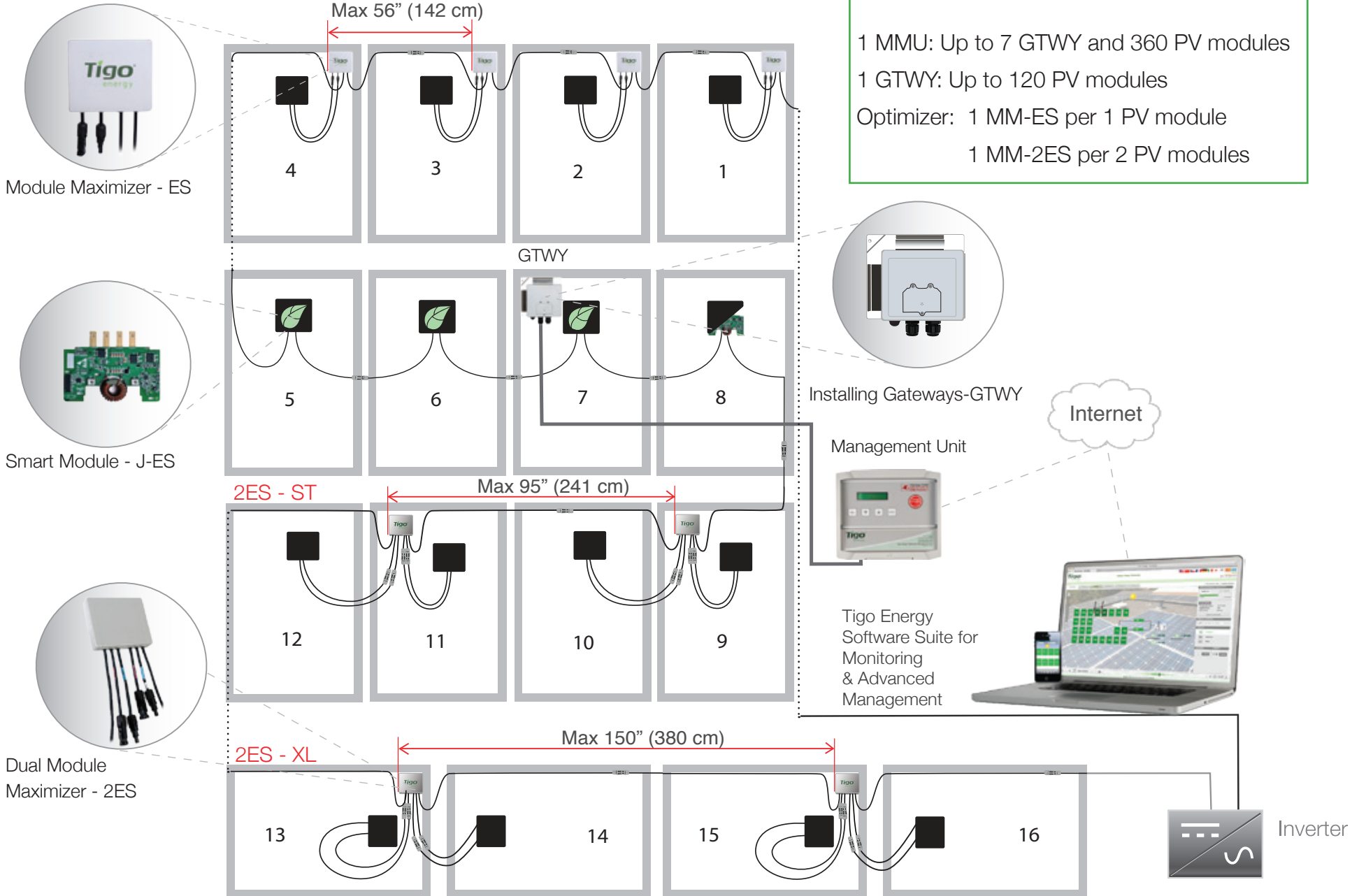
7. Initiating Discovery



8. Connecting Modbus Accessories (optional)



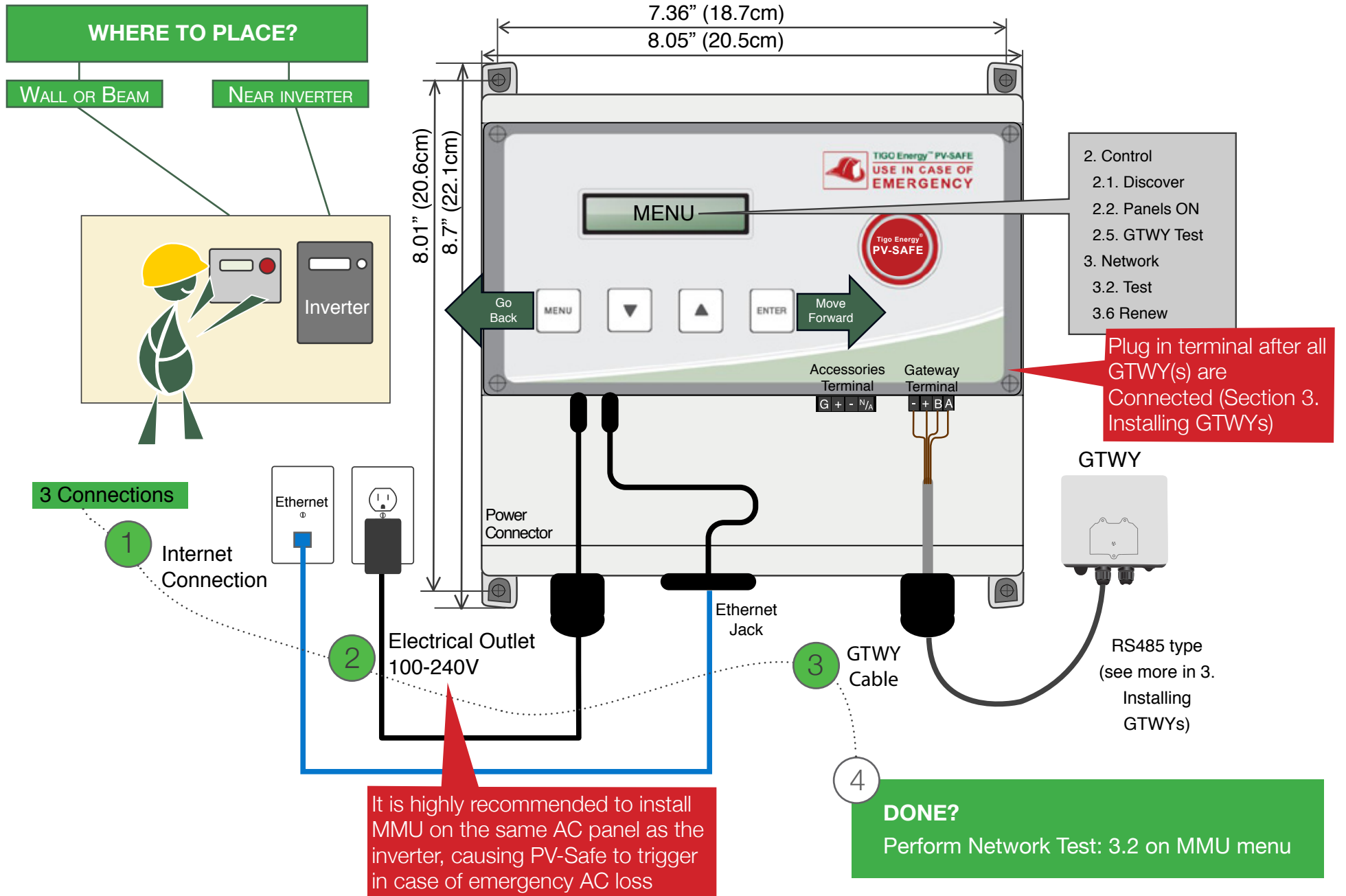
1. SYSTEM OVERVIEW



SYSTEM GUIDELINES:

- 1 MMU: Up to 7 GTWY and 360 PV modules
- 1 GTWY: Up to 120 PV modules
- Optimizer: 1 MM-ES per 1 PV module
- 1 MM-2ES per 2 PV modules

2. INSTALLING MANAGEMENT UNIT (MMU)



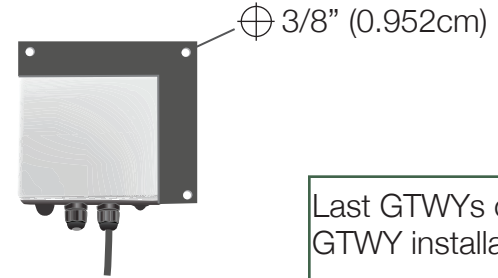
3. INSTALLING GATEWAYS (GTWY)

2 Run a wire from the MMU to the first GTWY

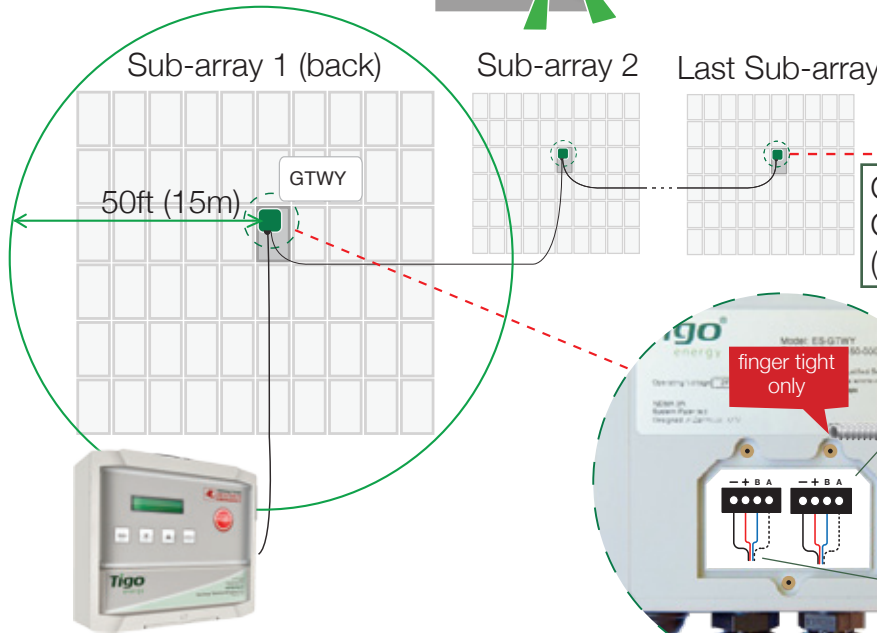


1 Place on back of PV module Or Racking system

In center of sub -array



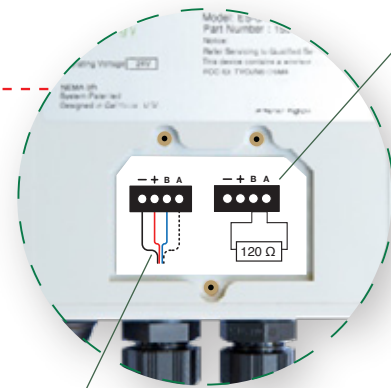
Last GTWYs or single GTWY installation



Connection to next GTWY (remove resistor first)



Inbound from MMU/previous GTWY connection to next GTWY



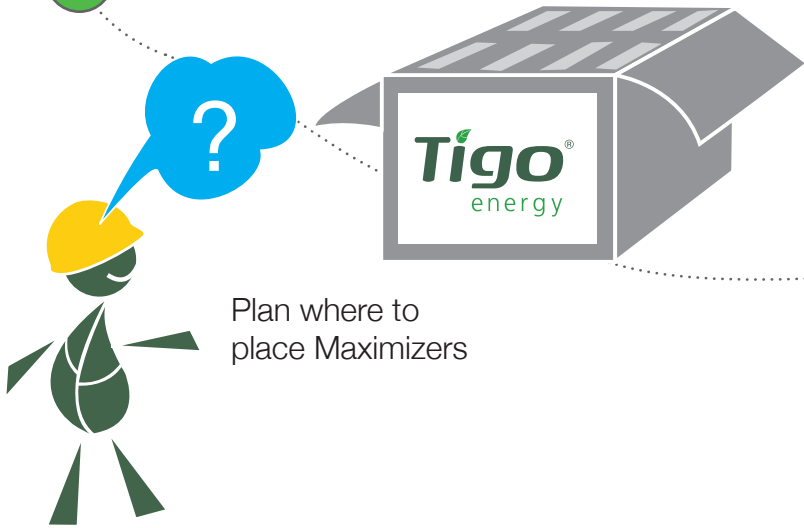
No. of GTWYs AWG (mm ²)	RS485 Cable length in ft. (m)						
	1	2	3	4	5	6	7
18 (0.82)	2604 (793)	2604 (793)	1817 (553)	1363 (415)	1090 (332)	908 (276)	716 (218)
20 (0.52)	2604 (793)	1714 (522)	1143 (348)	857 (261)	686 (209)	571 (174)	456 (138)
22 (0.33)	2156 (657)	1078 (328)	719 (219)	539 (164)	431 (131)	359 (109)	287 (87)
CAT 5/6	4067 (1,239)	2034 (619)	1356 (413)	1017 (309)	813 (247)	678 (206)	543 (165)

Standard communication cable: Type PLTC, 2 Twisted Pair, Sunlight Resistant or Direct Bury. Visit tigoenergy.com for additional information regarding RS485 recommended cables.

3 **DONE? Connect terminal in MMU**
Perform GTWY Test: 2.5 on MMU menu

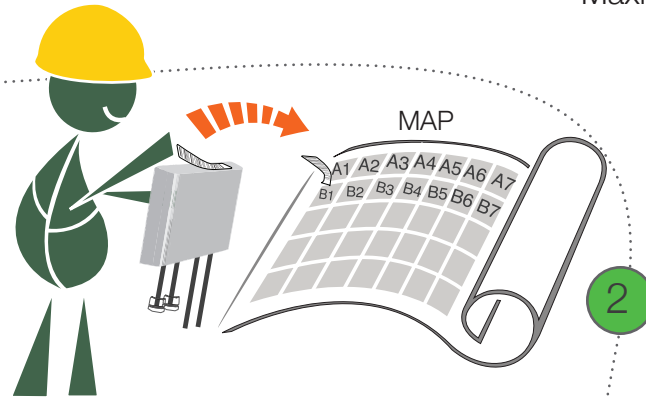
4. MAPPING

1

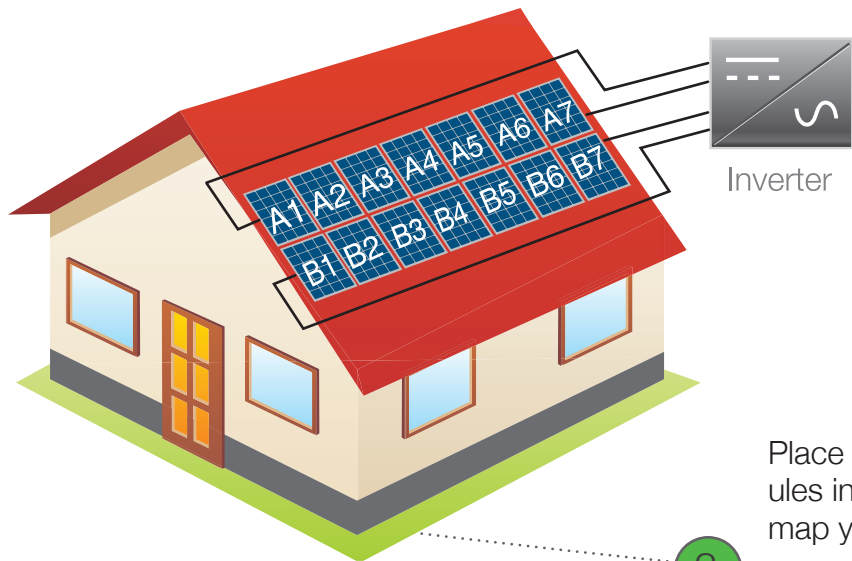


Plan where to place Maximizers

Take out Maximizer & remove 1 barcode sticker. Place the sticker on the map, string list, or construction drawing to match the physical location of the Maximizer



Site Name:		Tigo	
MMU ID	MAC ID	Gateway ID	MAC ID
Unit Name	MAC ID	Unit Name	MAC ID
1	A1	A1 Sticker Here	B1
2	A2		B2
3	A3		B3
4	A4		B4
5	A5		B5
6	A6		B6
7	A7		B7
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Inverter

Place Maximizers on the PV modules in a way that matches the map you made using barcodes

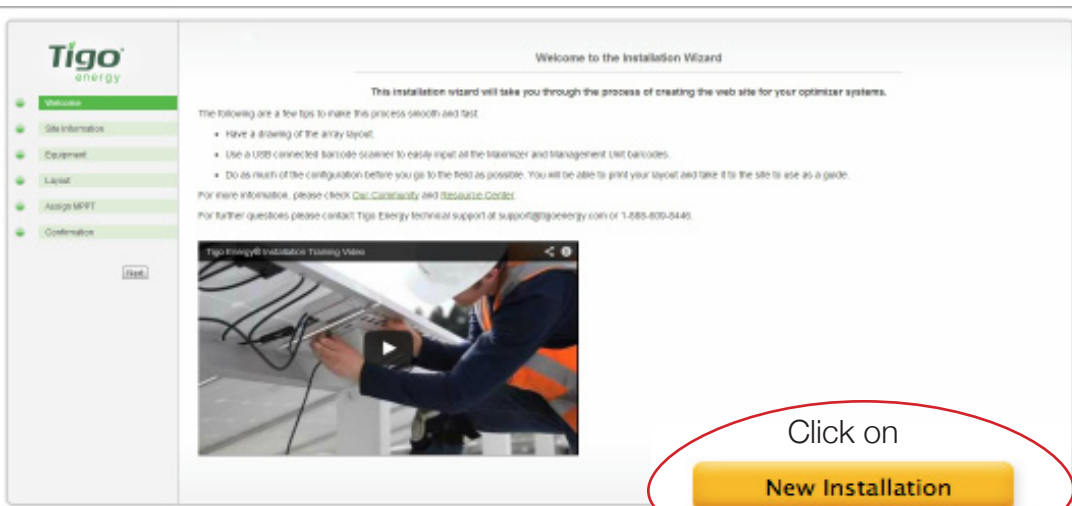
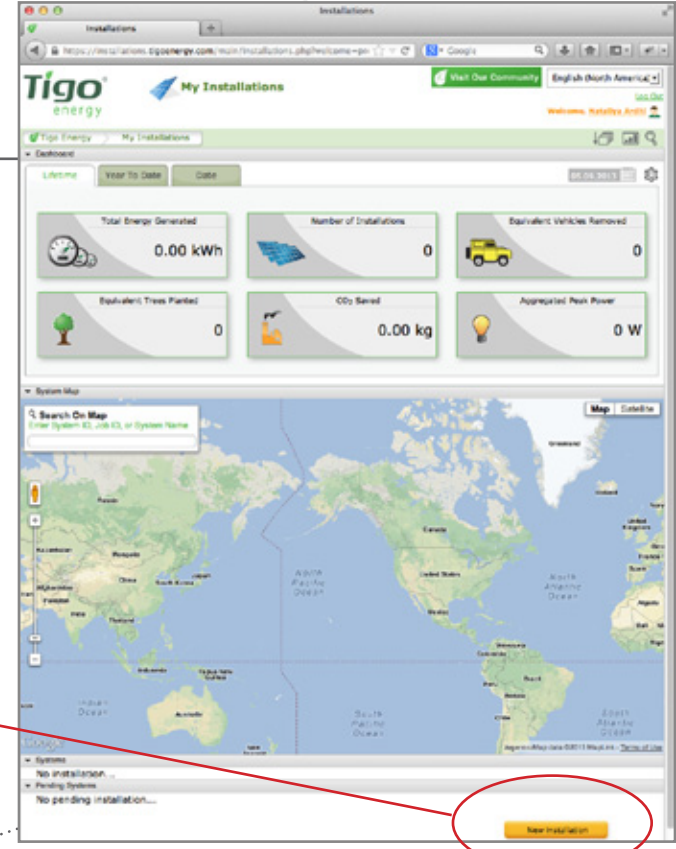
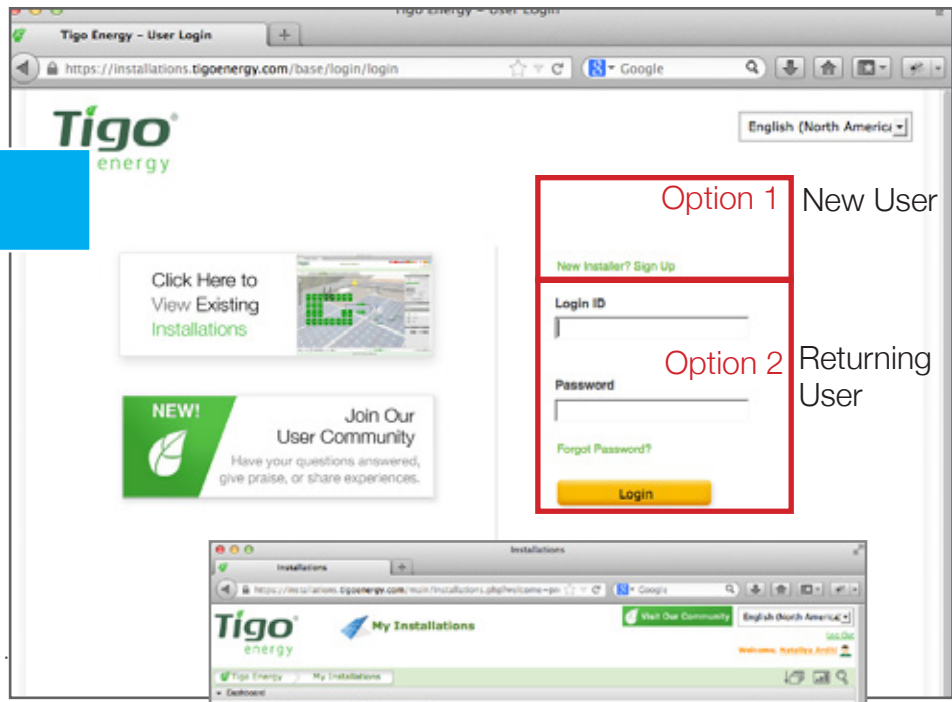
For 2ES installation:
 * Note that MM-2ES Dual Maximizers will have a single label for two modules.
 ** Input the barcode only on the first module in the pair. The second will be filled in automatically.

Also record the serial numbers of GTWY(s) and MMU(s)

5. CONFIGURING SYSTEM ONLINE

1

https://installations.tigoenergy.com/



3

Follow wizard instructions

2

Click on
New Installation

6. INSTALLING MAXIMIZERS

- 1 For general wiring refer to Section 3. System Overview.



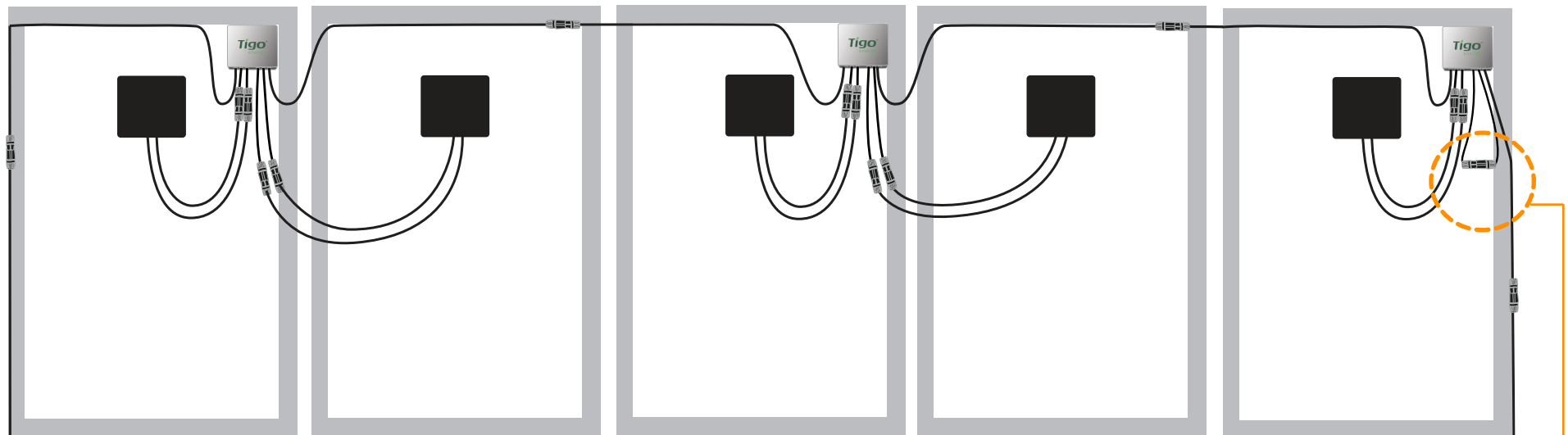
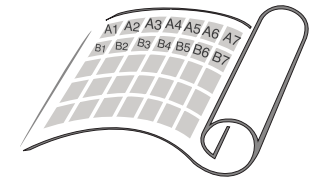
Don't forget to use string list template

Tigo
PowerLogic

Site Name	Gateway ID	Unit Name	MAC ID
Max ID	MAC ID	Unit Name	MAC ID
A1	A1 Sticker Here	B1	
A2		B2	
A3		B3	
A4		B4	
A5		B5	
A6		B6	
A7		B7	

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or map to keep track of Maximizer placement



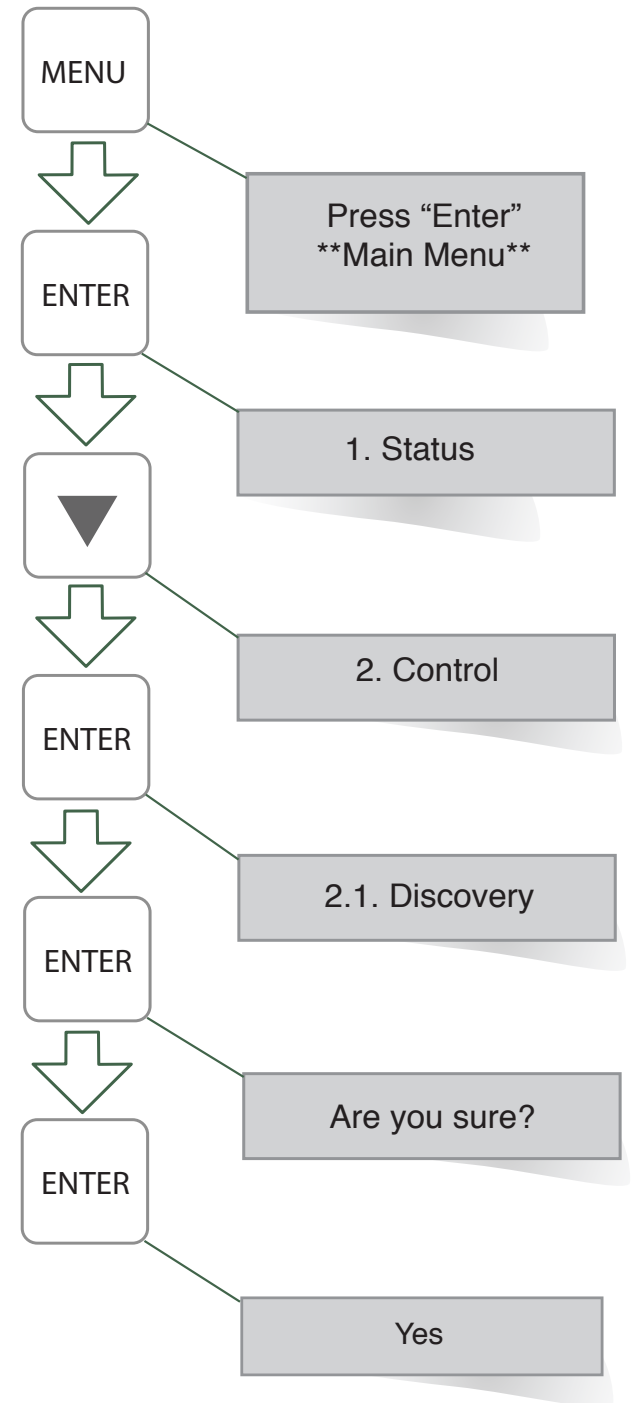
! The shortest pair of input leads should be connected to the first panel of each pair.

! When using 2ES Dual Maximizers on an odd-length string, connect the medium length input cables of the last Maximizer in the string together.

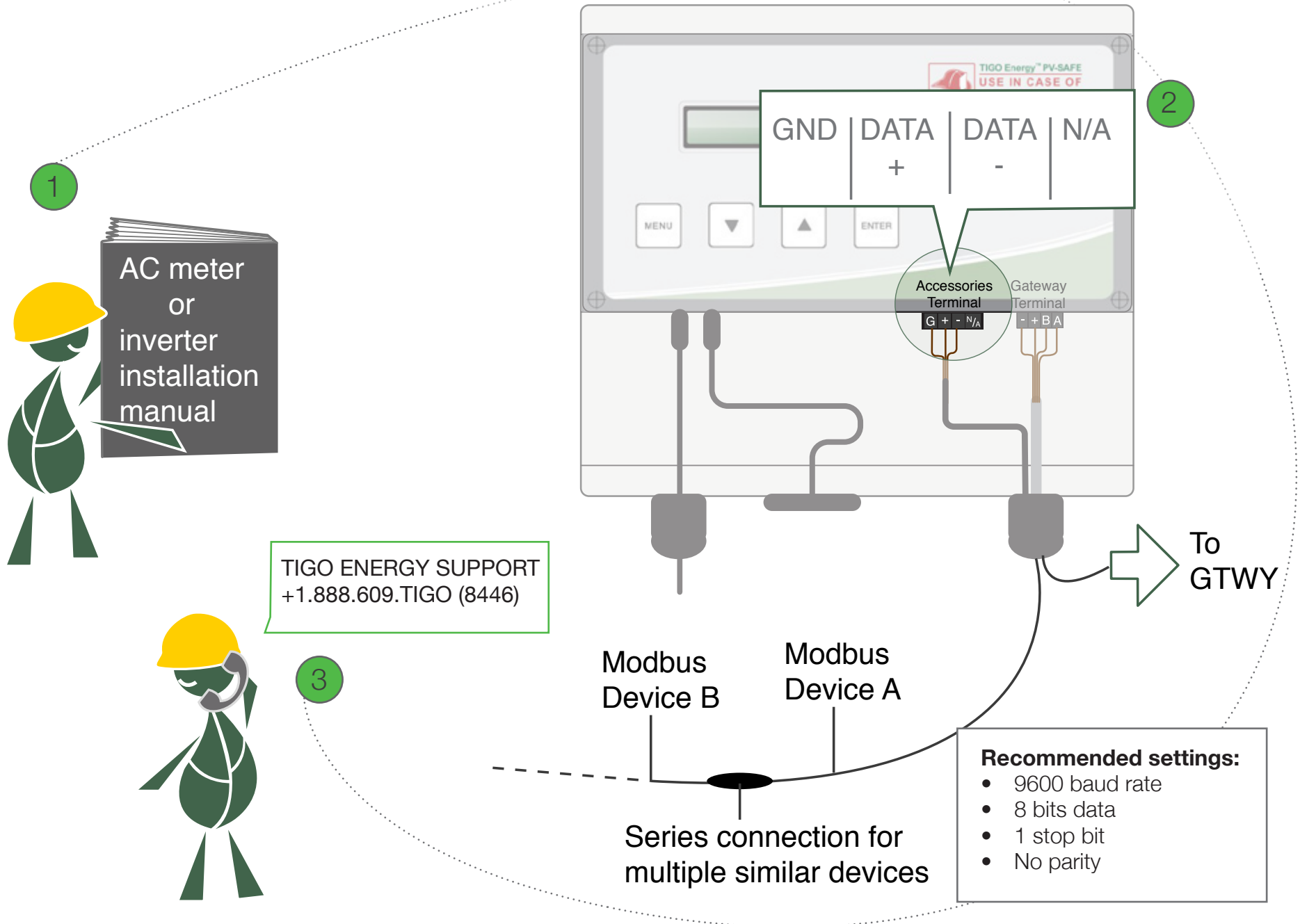
7. INITIATING DISCOVERY

For systems with multiple Management Units (MMU) initiate discovery one by one, ensuring that GTWY discovery is complete before moving to the next MMU.

This may take several minutes to several hours depending on the size of the system.



8. CONNECTING MODBUS ACCESSORY (OPTIONAL)



TECHNICAL SPECIFICATIONS

Electrical Specifications							
Per Input Data	MM-ES50	MM-ES75	MM-ES110	MM-ES170	MM-2ES50 (per input)	MM-2ES75 (per input)	MM-J-ES50/ HBF-ES50
Maximum power	300W	350W	300W	300W	375W	375W	375W
Maximum VDC (Voc)	52V	75V	110V	170V	52V	75V	52V
Vmp range	16-48V	30-65V	30-89V	30-140V	16-48V	30-65V	16-48V
Maximum current (Isc)	10A	7.5A	5A	3A	10A	7.5A	10A
Maximum Imp	9.5A	6.5A	4.7A	2.6A	9.5A	6.5A	9.5A
Series fuse rating	15A	10A	10A	10A	15A	10A	15A
Mechanical Specifications							
Dimensions ES, 2ES, GTWY	120 x 104 x 25 mm 4.72" x 4.09" x 0.98"	Dimensions JES	171 x 155 x 22 mm 6.73" x 6.10" x 0.87"	Dimensions MMU	221 x 205 x 80 mm 8.70" x 8.07" x 3.15"		
Maximizer OUTPUT Cables	PV wire 4mm ² 12AWG	Cable Length JES	1.0 m 39.37"	Cable Length HBF	1.2 M 47.24"		
ES Cable Length	1.0 M 39.37"	2ES Standard Length	1.3 m 51.18"	2ES XL length	2.1 m 82.68"		
Connector	MC4	TYCO SOLARLOCK - Tigo positive input accepts Tyco male (+) or neutral keying. Tigo negative input accepts female (+) or (-) keying. Do not connect any other type.					
Environmental Specifications							
Operating temperature ES, 2ES, GTWY	-30°C to +70°C -22°F to +158°F	Operating temperature J-ES	-40°C to +85°C -40°F to +185°F	Operating temperature MMU	0°C to +70°C 32°F to +158°F		
NEMA 3R, IP65, OVPIII, UV-F1/UL 94-5VA				Class 4K4H (per EN 50187)			
Communication (MMU to Internet)				MMU power supply rating			
Ethernet				24V		1A	
MMU Power Consumption				2.5W			
Gateway Power Consumption				0.5W			

