



This reference guide is provided as a quick source of product features, basic installation instructions, and system parameters for the ME-ARTR. This guide is not intended to replace the safety information or the detailed installation, setup, and operation information provided in the full ME-ARTR owner's manual. If not familiar with the ME-ARTR, thoroughly review the information in the owner's manual to ensure the proper setup of the ME-ARTR advanced router and the safe operation of your entire system. A copy of the full ME-ARTR owner's manual (PN: 64-0091) is installed on the USB thumb drive supplied with the ME-ARTR.



Info: This guide is for the ME-ARTR with Version 4.0 or higher; refer to the ARTR owner's manual for information on how to determine your router's version.

Important Product Safety Instructions

The following safety information is provided as a reminder of only some of the precautions contained in the full ME-ARTR owner's manual.

Safety Symbols

To reduce the risk of electrical shock, fire, or other safety hazard, the following safety symbols have been placed throughout this quick reference guide to indicate dangerous and important safety instructions.



WARNING: Indicates that failure to take a specified action could result in physical harm to the user.



CAUTION: Indicates that failure to take a specified action could result in damage to the equipment.



Info: Indicates information that emphasizes or supplements important points of the main text.

Product Safety Alerts

All electrical work must be performed in accordance with local, state, and federal electric codes.



WARNING:

- This product must not be exposed to rain, snow, moisture, or liquids of any type.
- Use insulated tools to reduce the chance of electrical shock or accidental short circuits.
- Remove all jewelry (such as rings, watches, bracelets, etc.) whenever installing or performing maintenance on the inverter.
- Always disconnect the batteries or energy source prior to installing or performing maintenance on the inverter. Live power may be present at more than one point since an inverter utilizes both batteries and AC—turning off the inverter may not reduce this risk. As long as AC power is connected, it will pass through the inverter regardless of the power switch on the inverter or the ON/OFF INVERTER button on the router.

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Introduction

The ME-ARTR (or “advanced router”) has the features required to parallel stack MS-PAE Series or MS-PE Series inverter/chargers. The router is designed to easily and quickly connect multiple inverter/chargers in parallel without the need to program each inverter. The router can accommodate up to: four MS-PAE Series or MS-PE Series inverter/chargers in parallel, two AGS modules, six BMKs, and one remote control.



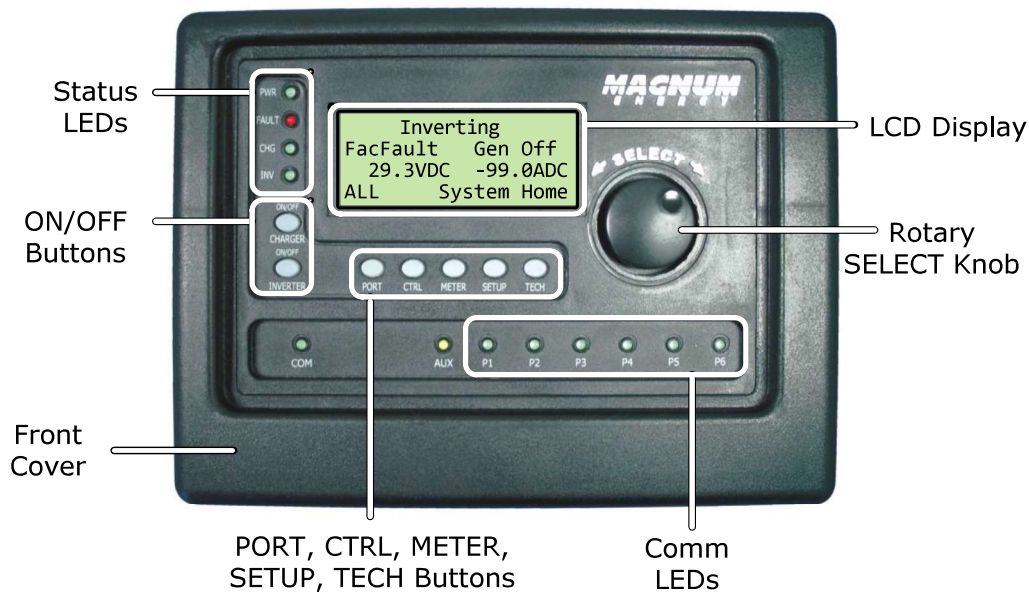
WARNING: The ME-ARTR owner’s manual (please download from our website to ensure the latest version) includes important safety and installation information that is critical for ensuring the proper setup of the ME-ARTR router and the safe operation of your entire system. Ensure you are familiar with this information before proceeding.

Contents

- ME-ARTR router (w/ removable cover)
- Two 6’ RJ14 remote cables
- Quick Reference Guide
- Two 6’ RJ45 stack cables
- #8 x 3/4 Phillips screws (x8)

Features

The ME-ARTR is equipped with the following features:

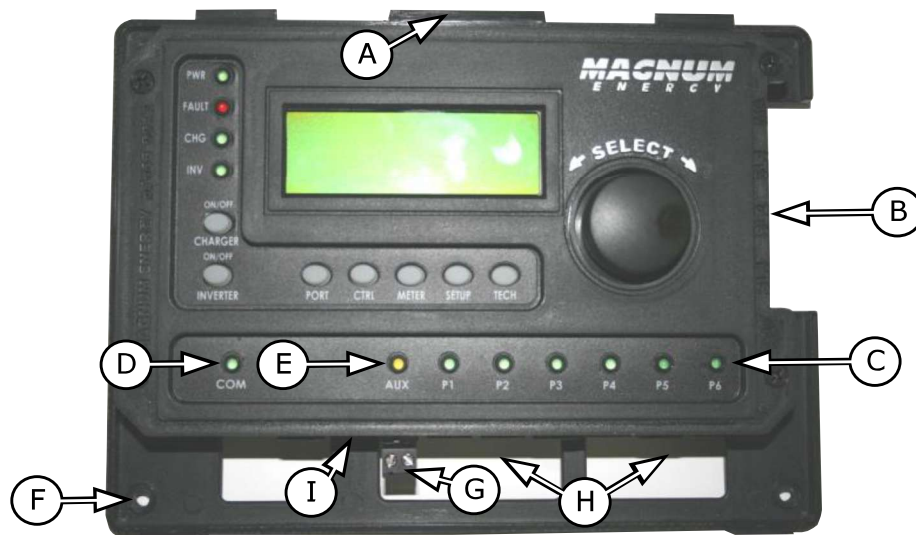


- **Status LEDs (x4)** – Provide the inverter/charger status in a straightforward way.
- **LCD Display** – Used for setting up the inverter/charger operation, as well as viewing current status or fault messages.
- **ON/OFF Buttons (x2)** – Allow all the connected inverters or chargers to be quickly enabled or disabled.
- **Rotary SELECT Knob** – Used to quickly scroll through Ports 1-6, and to select and save various LCD-displayed menu items and settings.
- **Comm LEDs (x6)** – Provide the connection statuses of the communication ports.
- **Front Cover** – Removable front frame cover, allows access to the cable connections and mounting holes.

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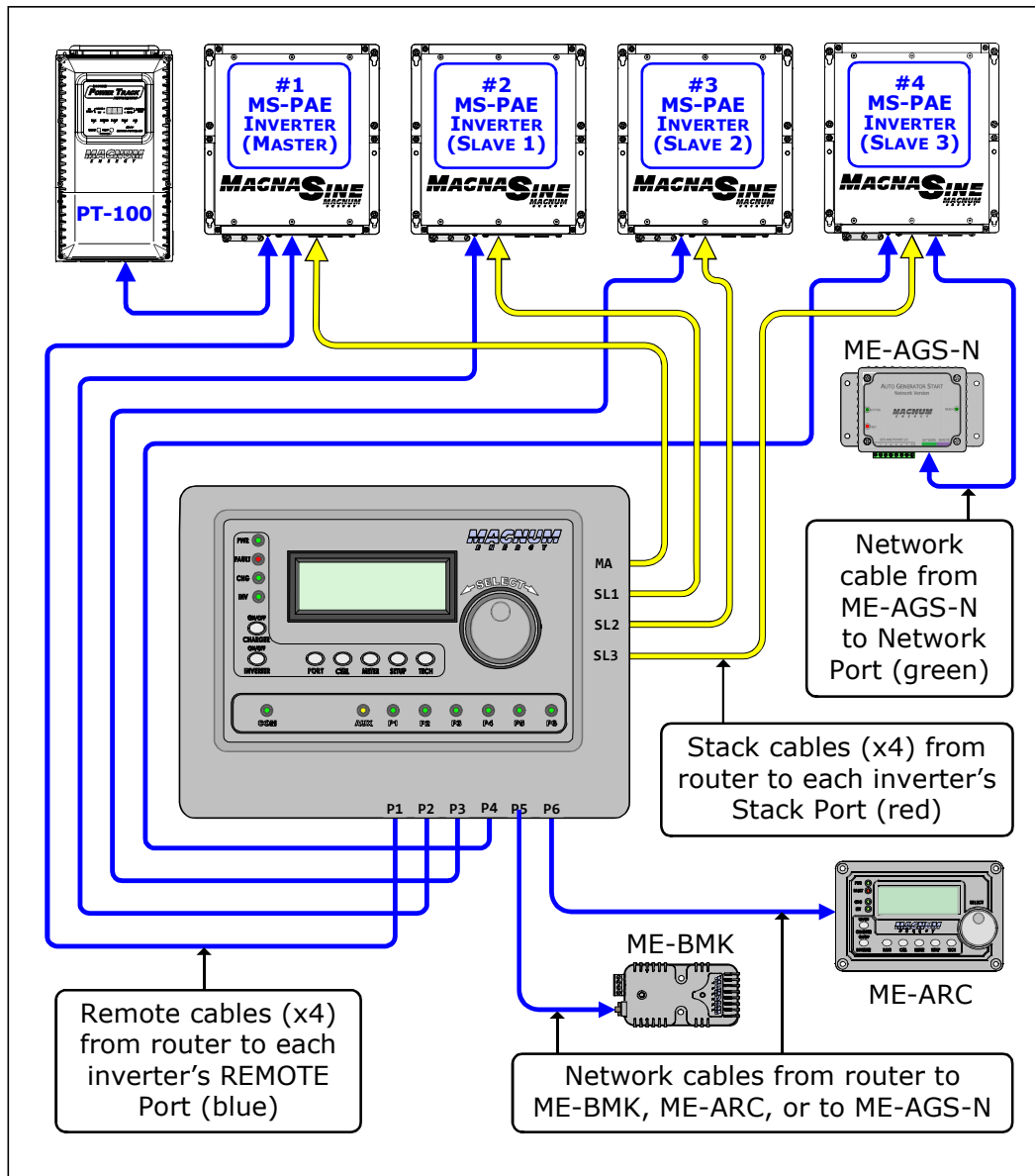
- Menu Buttons (x5)** – Allow the inverter or charger to be configured to your specific system preferences. These buttons also allow simple access to menu items that can help with monitoring and troubleshooting.
 - PORT Button** – Accesses the six communication and accessory ports to display information on any connected devices.
 - CTRL Button** – Used to select inverter, charger, and AGS functions previously set up using the SETUP button.
 - METER Button** – Used to access 'read only' DC, AC, Timer, AGS, and BMK meters.
 - SETUP Button** – Used to access the setup menus for the inverter, charger, AGS, and BMK. The SETUP button may be password protected to keep unauthorized users from accessing the SETUP menus.
 - TECH Button** – Used to access technical information, fault history, and to set a password for the SETUP button.
- Auxiliary (Aux) Relay** – Can be programmed to work either as a voltage-controlled relay (stays opened or closed based on VDC, and activates either as an active high or active low type relay with an adjustable time delay), a SOC-controlled relay (stays opened or closed based on the battery's state of charge*), or used as an inverter fault detection relay (opens if an inverter fault occurs).

** Requires the optional ME-BMK (Battery Monitor Kit) to be installed.*
- SD Memory Card Slot** – Allows you to download and install updated firmware from the Magnum Energy product website—using a standard SD memory card. See Section 7.0 in the full ME-ARTR manual for more info.



- | | |
|---|-------------------------------|
| (A) Mounting tabs for front cover | (F) Mounting screw holes (x4) |
| (B) Parallel stack ports (x4) | (G) Aux Relay 2-wire terminal |
| (C) Six LEDs for communication (P1-P6) | (H) Six Comm ports (P1-P6) |
| (D) LED for future use (not functional) | (I) SD memory card slot |
| (E) LED for Aux Relay operation | |

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Installation

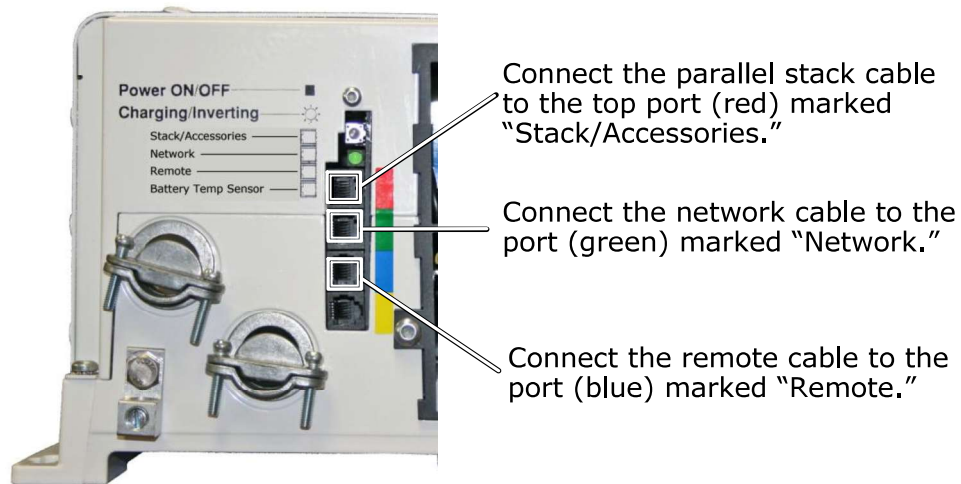
Once the ME-ARTR has been appropriately located and mounted, you can begin routing and connecting the supplied RJ14 and RJ45 cables. View the figures (above and on top of next page) for reference.

To connect the remote cables:

1. Using the supplied RJ14 cables, connect a remote cable to the Remote port (blue) on every inverter installed in parallel.
2. Route the inverter-connected remote cables from each inverter/charger to the router—connect each remote cable to its respective communication port on the router.

To connect the parallel stack cables:

1. Using the supplied RJ45 cables, connect a stack cable to the Stack/Accessories port on every inverter installed in parallel.
2. Route the inverter-connected stack cables from each inverter/charger to the router—connect each stack cable to its respective stack port on the router (one stack cable must be plugged into the router's MA port).



Wiring the Auxiliary (Aux) Relay

The Aux Relay provides a 2-wire dry contact relay (i.e., no voltage provided) that is either open or closed, and can be wired to any device requiring a contact closure to operate. For example, it can be used as a signal relay to power a higher current relay.

Relay Information

- A single-pole, single-throw relay provided with the NO (Normally Open) and COM contacts.
- Contact rating: up to 30 VDC @ 1 amp, and from 31 VDC up to 60 VDC @ .25 amp.
- Opens if power to the router (provided through the inverter remote cable) is lost.
- Provides "dry contact" connections (it does not provide any voltage or current)—power for any external device requiring voltage or current must be provided through the relay.
- This relay is not intended to directly provide power. Rather, this relay can be used to send a signal to operate the coil of another higher amperage device that does the actual switching of power.



CAUTION:

- Any voltage connected to the relay must be less than or equal to the relay's contact ratings (Contact Ratings: $\leq 1A$ up to 30 VDC, $\leq .25A$ from 31 VDC to 60 VDC).
- An in-line fuse rated up to 1 amp (up to 30 VDC) or .25 amp (from 31 VDC to 60 VDC) must be used to protect all power circuits connected to the Aux Relay (do not fuse ground connections). The fuse should be located as close as possible to the power source. A fuse must be used, even if the circuit is providing only a "dry contact" or "ground" connection—it will prevent damage if the connection is miswired or damaged. Ensure the fuse is correctly rated for the wire size used. Refer to national and local codes for rating and type.
- The Aux Relay circuit is not rated for AC volts and may cause damage if used.
- The ME-ARTR's warranty does not cover damage to relay.

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Relay Terminal Block

The Aux Relay is wired through a Euro-style removable connector. The connector provides a two-port screw-type terminal block for wiring. This terminal block is friction-fit into the connector and can be removed by pulling it straight out. Each port on the terminal block accepts a CU/AL single wire from #28 to #12 AWG (0.3 to 2.3 mm²).



Info: For info on setting the Aux Relay, refer to the *CTRL: 04 ARTR Aux Relay* menu section in your ME-ARTR owner's manual.



Info: The voltage settings in the table below are based on the Battery Temperature Sensor (BTS) at a temperature of 77°F (25°C), or not connected. If the BTS is connected, the actual charge voltage increases if the temp around the BTS is <77°F (25°C), and decreases if >77°F (25°C). This ensures the batteries receive the correct charge voltage regardless of temperature.

Battery Type to Charge Voltages (Fixed Voltage)

Battery Type	Inverter Voltage	Absorption Voltage	Float Voltage	Equalization Voltage
GEL	12 VDC	14.1 VDC	13.6 VDC	14.1 VDC ¹
	24 VDC	28.2 VDC	27.2 VDC	28.2 VDC ¹
	48 VDC	56.4 VDC	54.4 VDC	56.4 VDC ¹
Flooded	12 VDC	14.6 VDC	13.4 VDC	15.5 VDC
	24 VDC	29.2 VDC	26.8 VDC	31.0 VDC
	48 VDC	58.4 VDC	53.6 VDC	62.0 VDC
AGM1 ²	12 VDC	14.3 VDC	13.1 VDC	15.5 VDC
	24 VDC	28.6 VDC	26.2 VDC	31.0 VDC
	48 VDC	57.2 VDC	52.4 VDC	62.0 VDC
AGM2 ³	12 VDC	14.5 VDC	13.5 VDC	14.5 VDC ¹
	24 VDC	29.0 VDC	27.0 VDC	29.0 VDC ¹
	48 VDC	58.0 VDC	54.0 VDC	58.0 VDC ¹
Custom ⁴	12 VDC	12.0-16.0 VDC	12.0-16.0 VDC	12.0-16.0 VDC
	24 VDC	24.0-32.0 VDC	24.0-32.0 VDC	24.0-32.0 VDC
	48 VDC	48.0-64.0 VDC	48.0-64.0 VDC	48.0-64.0 VDC
CC/CV	12 VDC	12.0-16.0 VDC	12.0-16.0 VDC	12.0-16.0 VDC
	24 VDC	24.0-32.0 VDC	24.0-32.0 VDC	24.0-32.0 VDC
	48 VDC	48.0-64.0 VDC	48.0-64.0 VDC	48.0-64.0 VDC

Note¹: Voltage same as absorption voltage—to prevent equalization.

Note²: Charge voltages for Concord (Lifeline Series) AGM batteries.

Note³: Charge voltages for East Penn, Deka, Discover and Trojan AGM batteries.

Note⁴: When using the Custom setting, the EQ (Equalization) voltage adjustment cannot be set lower than the Absorb Voltage setting. Also, the EQ Voltage adjustment cannot be set higher than 2 volts (12-volt systems), 4 volts (24-volt systems), or 8 volts (48-volt systems) above the Absorb Voltage setting.

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Battery Amp/Hrs Capacity to Suggested Absorb Time

Battery AmpHrs Capacity	Suggested Absorb Time	Battery AmpHrs Capacity	Suggested Absorb Time
200 to 300	60 minutes	1310 to 1500	240 minutes
310 to 500	90 minutes	1510 to 1700	270 minutes
510 to 700	120 minutes	1710 to 1900	300 minutes
710 to 900	150 minutes	1910 to 2100	330 minutes
910 to 1100	180 minutes	2110 to 2300	360 minutes
1110 to 1300	210 minutes	2310 to 2500	390 minutes

Inverter/Charger Default Settings on ME-ARTR

Menu Items	Default Settings
Search Watts	5 Watts
LowBatCutOut	10 VDC (12v), 20 VDC (24v), 40 VDC (48v)
AC In – Time	Connect = 6:00AM, Disconnect = 6:00PM
AC In – Volts DC	Connect = 11.0V (12v), 22.0V (24v), 44.0V (48v) Disconnect = 14.1V (12v), 28.2V (24v), 56.4V (48v)
AC In – SOC	Connect = 80%, Disconnect = 100%
Inv Always Power-up	NO
Inv Threshold to Start Parallel	60%
AC Input Amps	30 Amps (AC1), 20 Amps (AC2)*
Low VAC Dropout	80 VAC (AC1), 70 VAC (AC2)*, (Exports – 150 VAC)
Battery Type	Flooded
Absorb Done	Time = 2.0 Hrs, Amps = 20 ADC, SOC = 100%
Max Charge	Rate = 100%, Time = 12.0 Hrs
Final Charge Stage	Multi-Stage
Always Start Charge in Bulk	Disabled

* AC2 settings available on MSH4024RE models only.

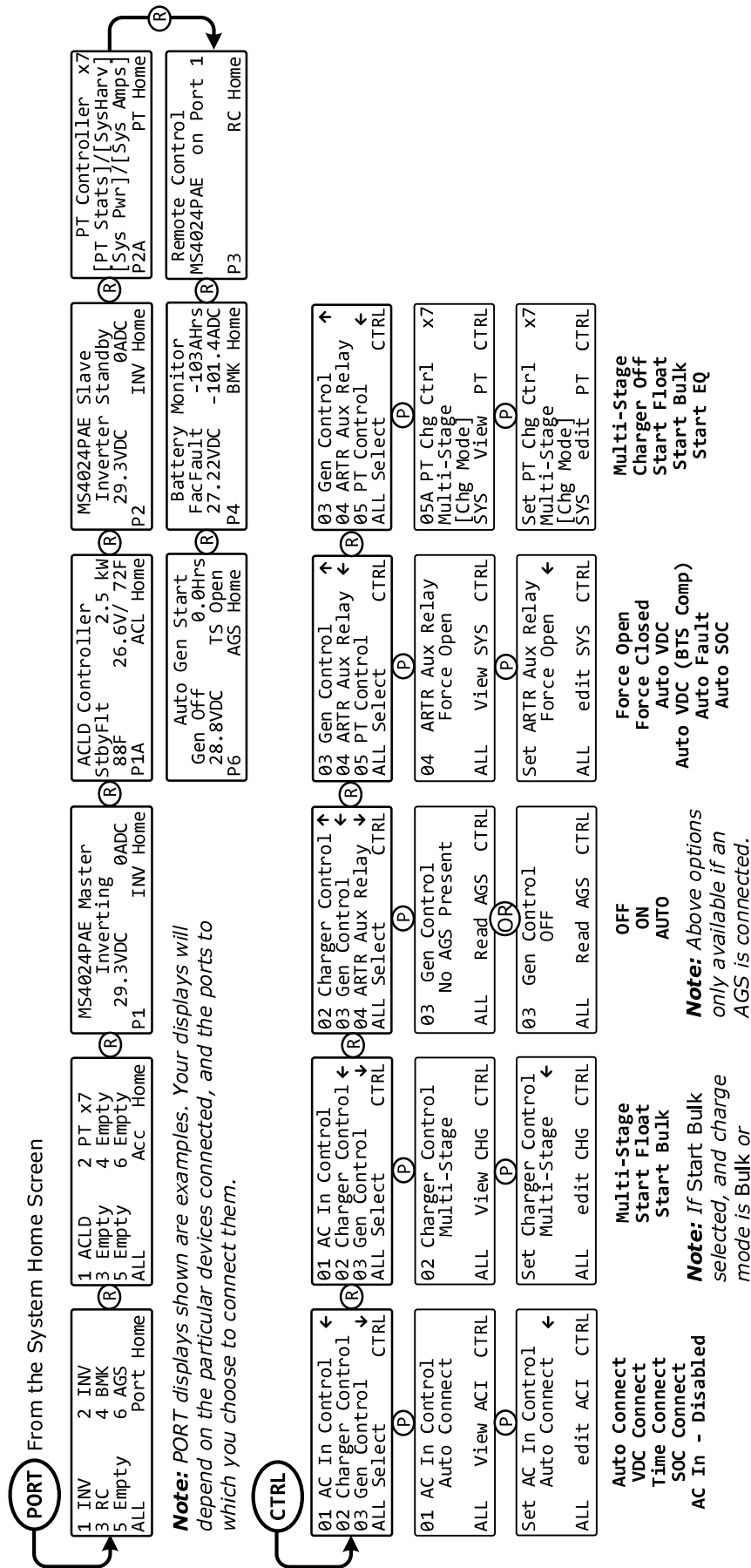
Index to Menu Maps

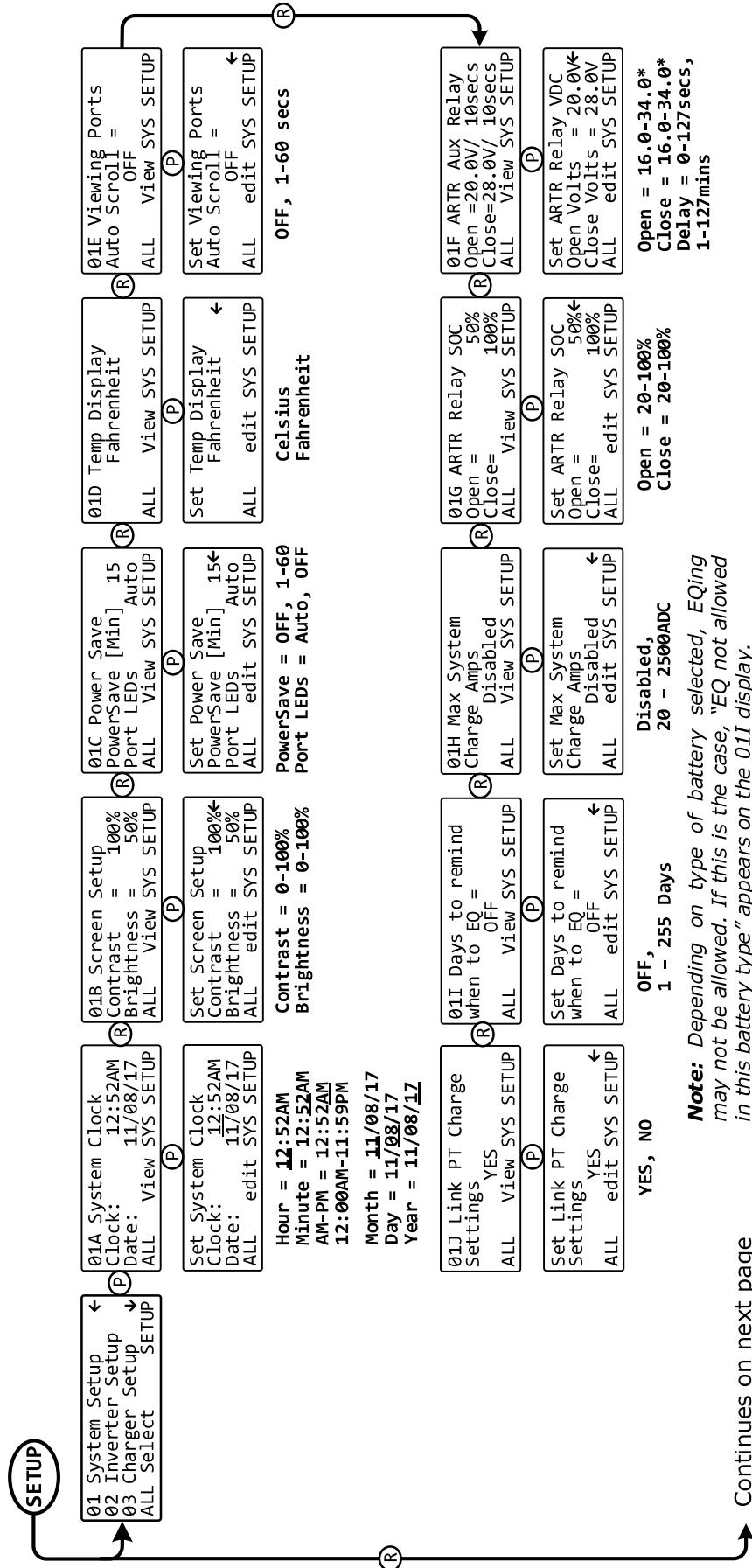
Inverter/Charger PORT/CTRL Menu Maps	page 9
Inverter/Charger METER Menu Maps	page 10
Inverter/Charger SETUP1 Menu Maps	page 11
Inverter/Charger SETUP2 Menu Maps	page 12
Inverter/Charger SETUP3 Menu Maps	page 13
Inverter/Charger TECH Menu Maps	page 14
AGS PORT/CTRL/METER/TECH Menu Maps	page 18
AGS SETUP Menu Maps	page 19
BMK PORT/METER/SETUP Menu Maps	page 20
ACLD METER Menu Maps	page 21
PT TECH/CTRL Menu Maps	page 22
PT METER Menu Maps	page 23
PT DATA HISTORY1 Menu Maps	page 24
PT DATA HISTORY2 Menu Maps	page 25
PT SETUP Menu Maps	page 26

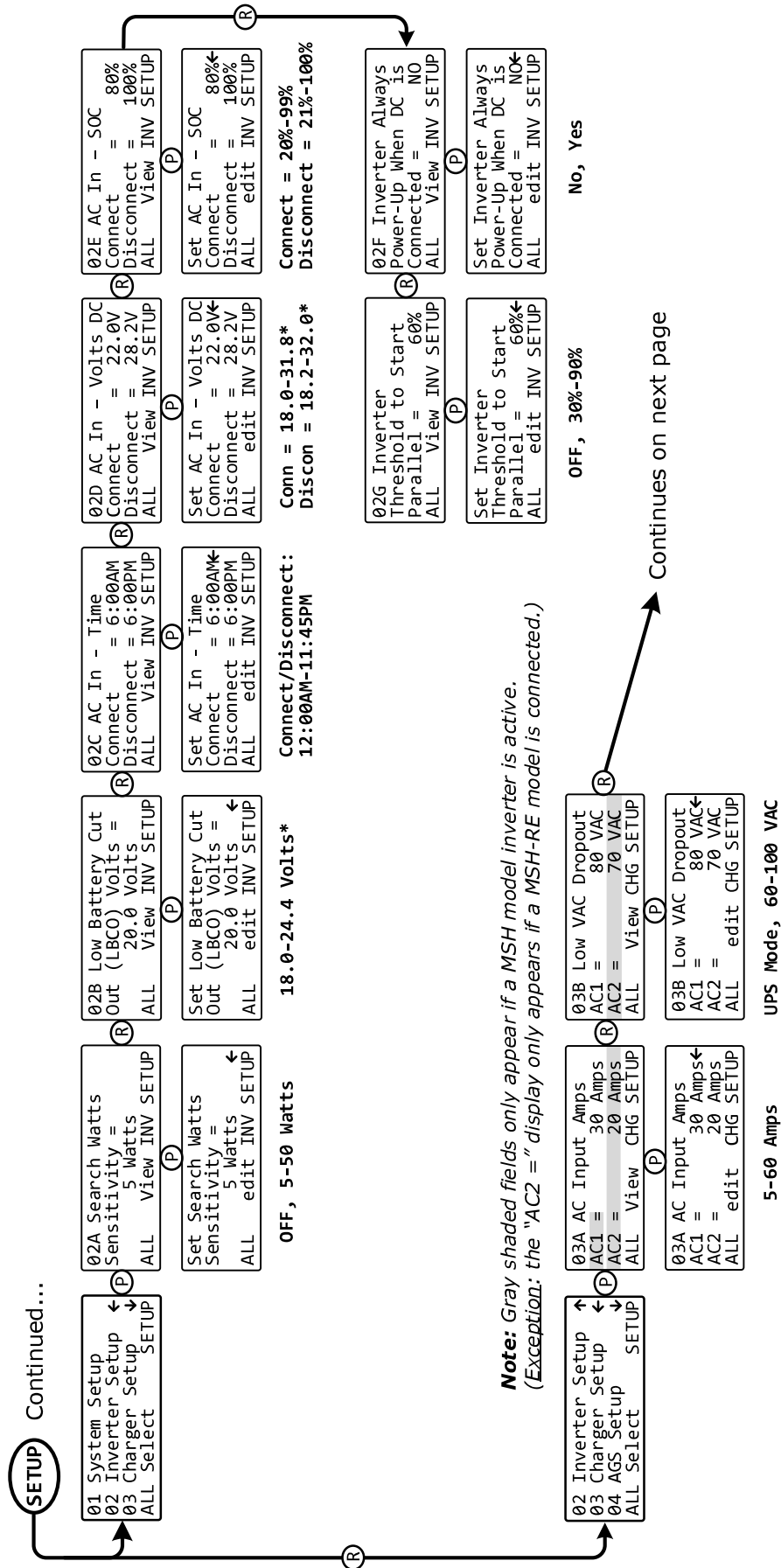
Use the KEY below for all menu maps in this guide:

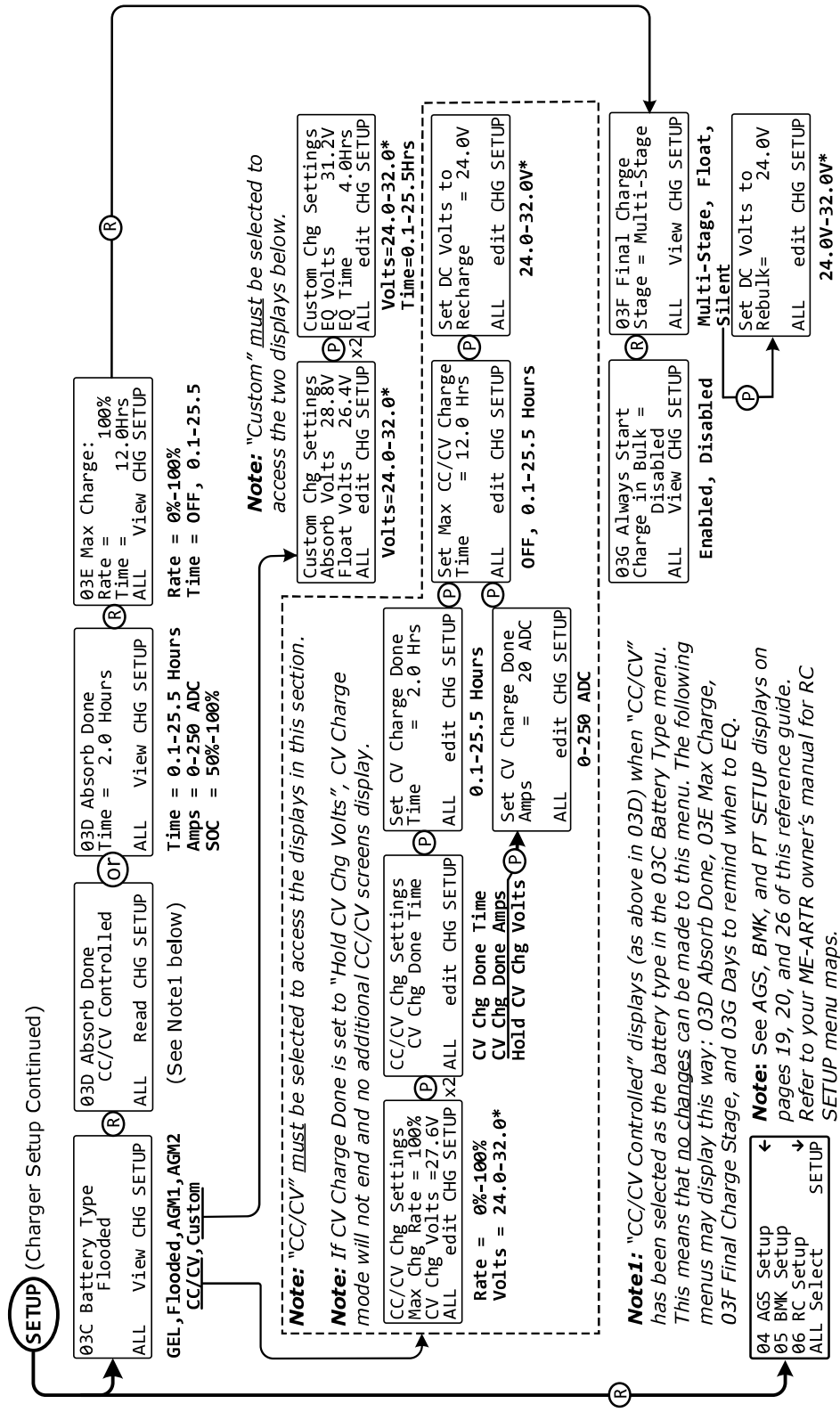
KEY

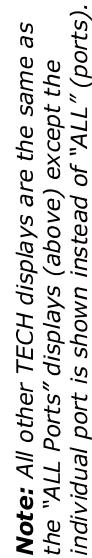
- Ⓟ = Press SELECT knob
- Ⓡ = Rotate SELECT knob
- * = DC voltage settings shown in 24-volt nominal values.











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LED Indicator Guide

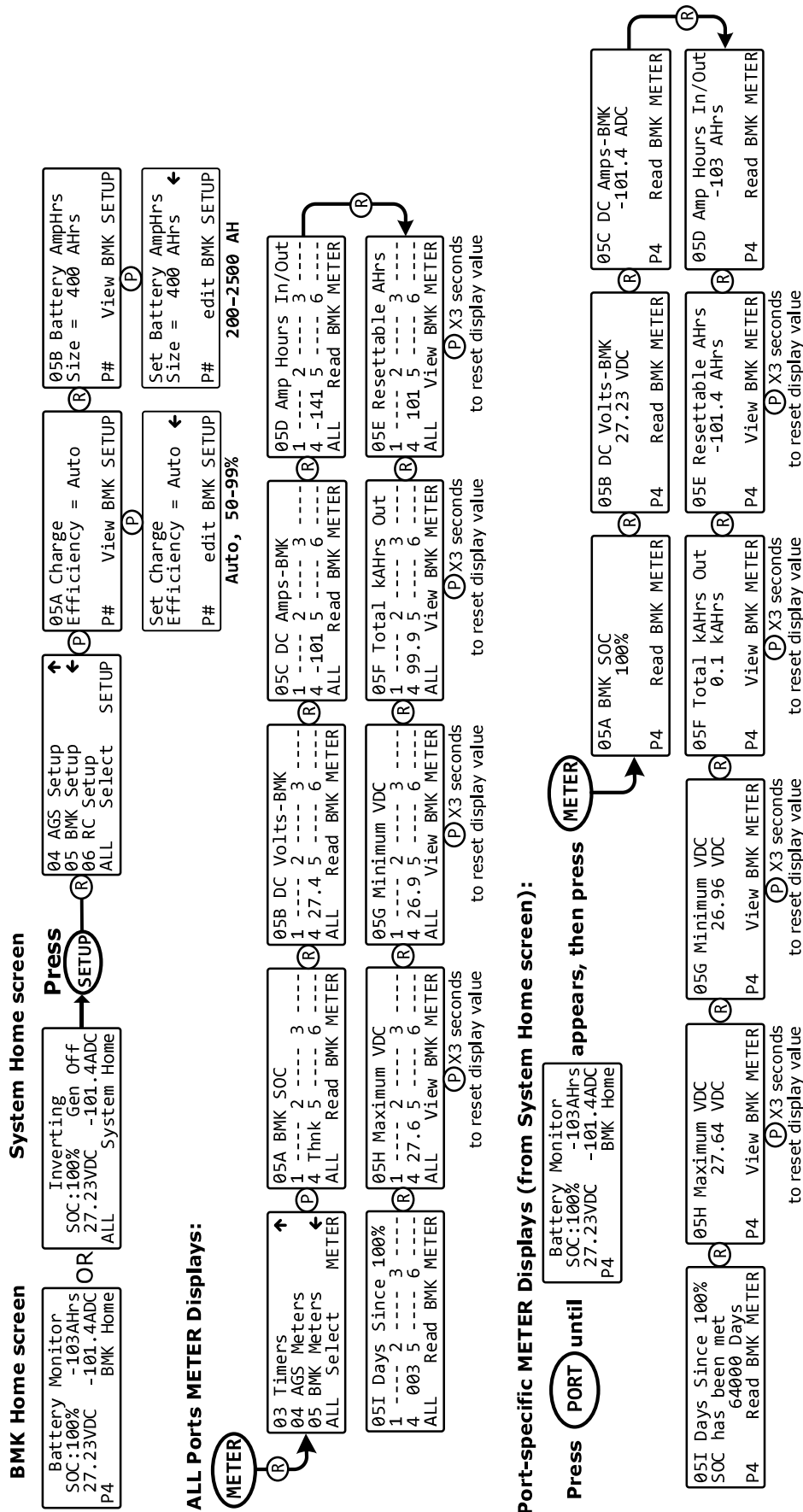
LED	Status	Meaning
PWR (green)	OFF	1) Inverter is disabled; 2) Router's in Power Save mode – press any button to activate the LEDs; 3) No power to router (check router cable or power to inverter); or, 4) No AC power at the inverter's AC output.
	ON	AC power is available from inverter, utility, or generator at the inverter's AC output terminals.
FAULT (red)	OFF	Normal operation – no fault condition.
	ON	A fault condition has been detected. Check the LCD display to find and correct the cause.
	BLINKING	A fault condition has been detected. Press the PORT button or rotate the SELECT knob until the FAULT LED turns solid.
CHG (green)	OFF	1) Router is in Power Save mode – press any button to activate LEDs; or, 2) Charger off – no utility or AC generator present.
	ON	In Charge mode – see the LCD display to determine charge status.
	BLINKING, displays "Charger Standby"	The charger is in Charger Standby mode. This occurs when the ON/OFF CHARGER button is pressed to disable the charger.
	BLINKING, displays "Full Charge" or "Silent"	The charger is in Battery Saver mode. This mode monitors battery voltage level and only charges if the battery voltage decreases to a low level. Silent mode will automatically start charging when the ReBulk setting is reached.
	BLINKING, displays "Max Charge Time"	This indicates that the Max Charge Time safety feature has been enabled causing the charger to enter the Float or Silent charge mode to prevent the charger from holding the batteries at a high voltage for a prolonged period of time. Note: To reset the green CHG LED and the Max Charge Time display, either reconnect the AC input and start the "Charging" status, or start another Bulk, EQ, or Constant Current charge cycle.
	BLINKING, displays "Reminder to EQ"	This is provided as a reminder that it is time to equalize the batteries. The CHG indicator comes on when the <i>SETUP: 01I Days to Remind when to EQ</i> setting has been enabled and the # of days has been exceeded. Note: To reset the green CHG LED and the EQ Reminder display, start an EQ charge.

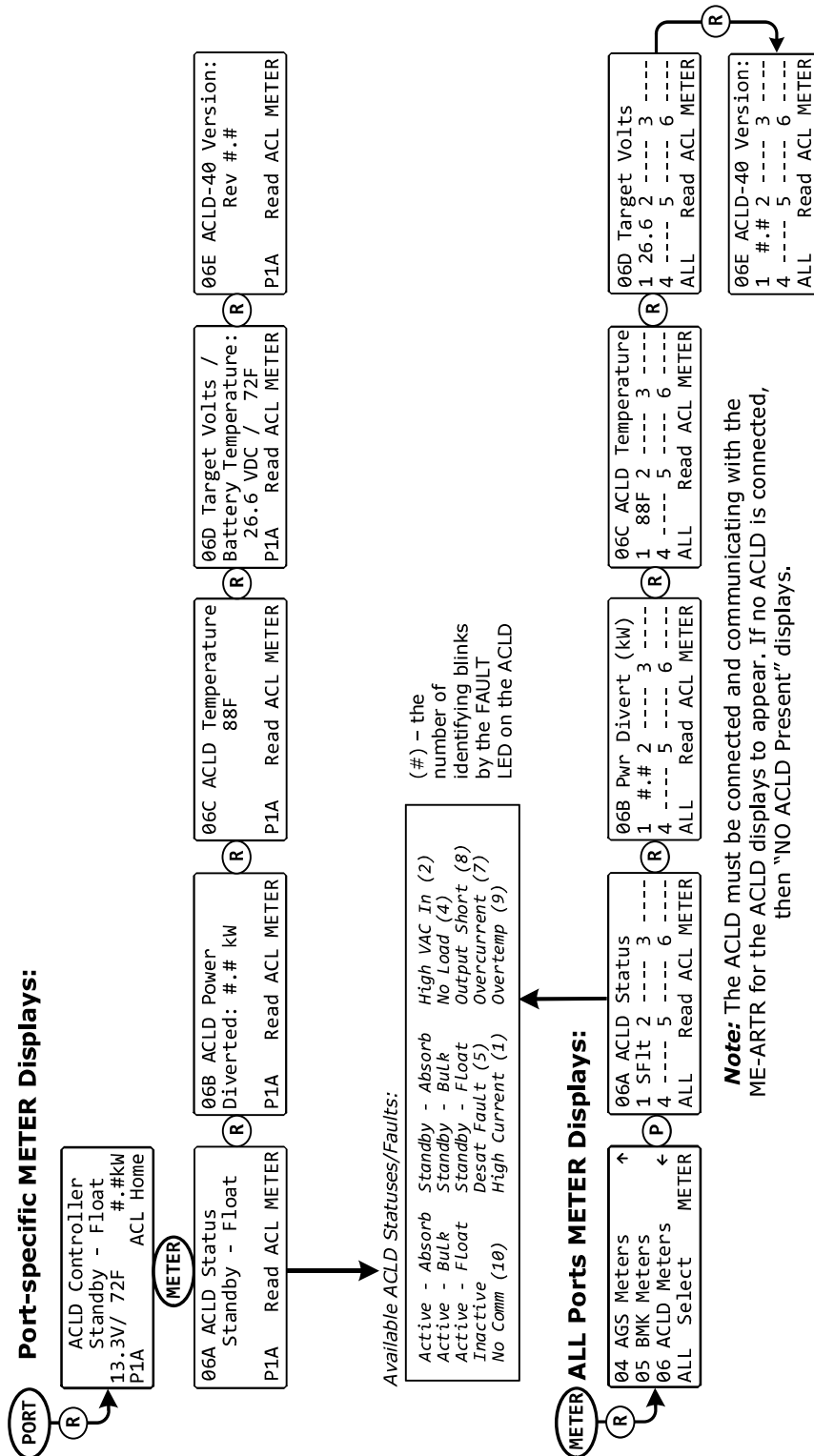
LED Indicator Guide (Cont.)

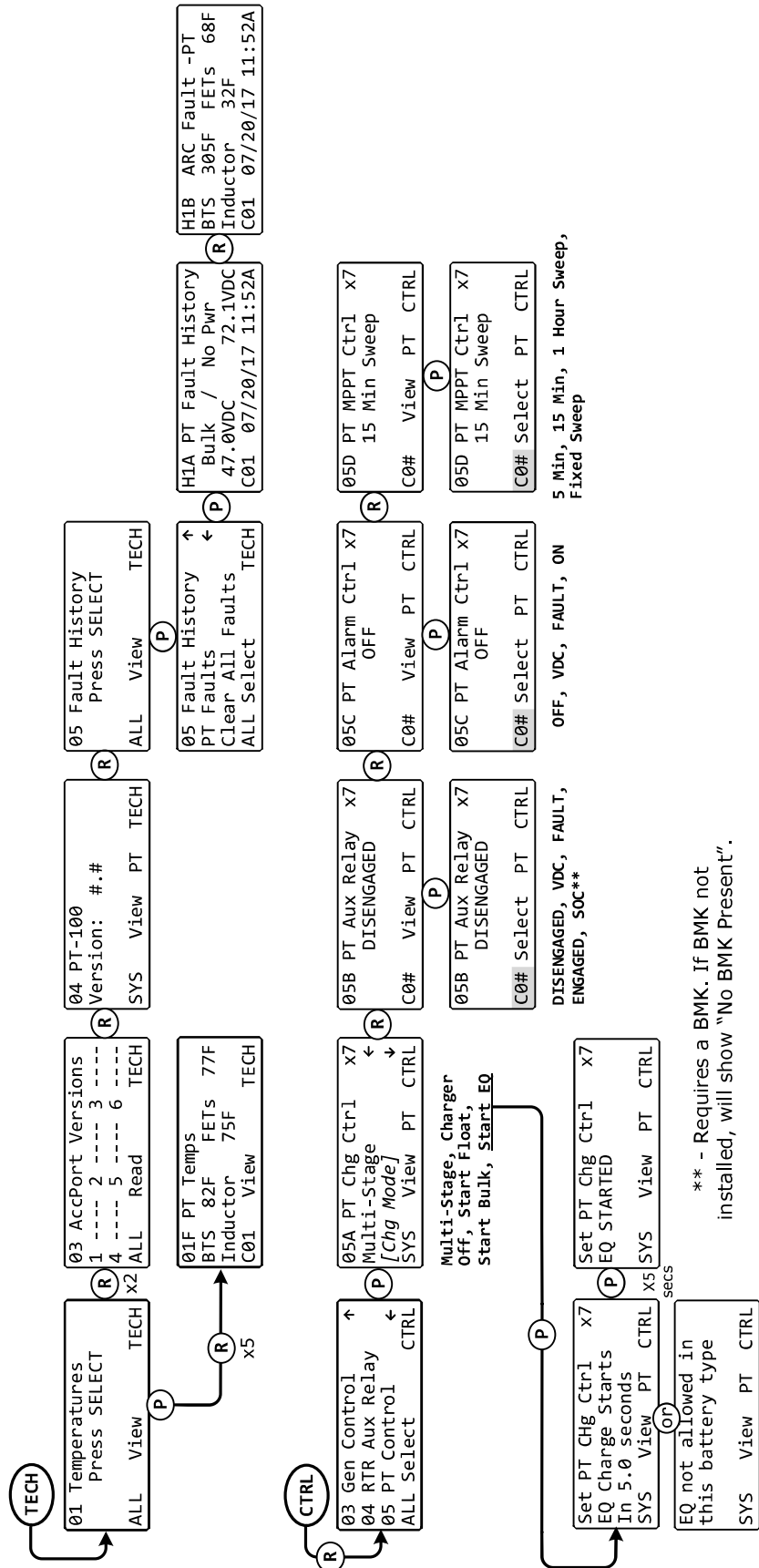
LED	Status	Meaning
CHG (green)	BLINKING, display shows a charging status (i.e., Bulk, Absorb, Float)	The charger current is automatically decreased because: 1) Charger Back-off – the inverter’s internal temperature is getting hot, current is decreased to reduce/ maintain temperature; or, 2) Low AC Input Voltage – the input AC voltage is < 85 VAC, charger is disabled to help stabilize incoming AC voltage to prevent AC disconnect.
	BLINKING, with no charge status	The inverter is detecting AC voltage (from utility or an AC generator) on the inverter’s AC input terminals.
INV (green)	OFF	1) Inverter is disabled; or, 2) Router is in Power Save mode – press any button to activate LEDs.
	ON	Inverter is enabled – 1) Supplying AC power on the output; or, 2) If both INV and CHG LEDs are on, then the inverter input is connected to utility or generator power and is in Standby mode. The inverter will automatically power the AC loads if the incoming AC power is lost.
	BLINKING	Inverter is in Search mode (the AC load is below the SETUP button’s 02A Search Watts setting).

Router Troubleshooting Guide

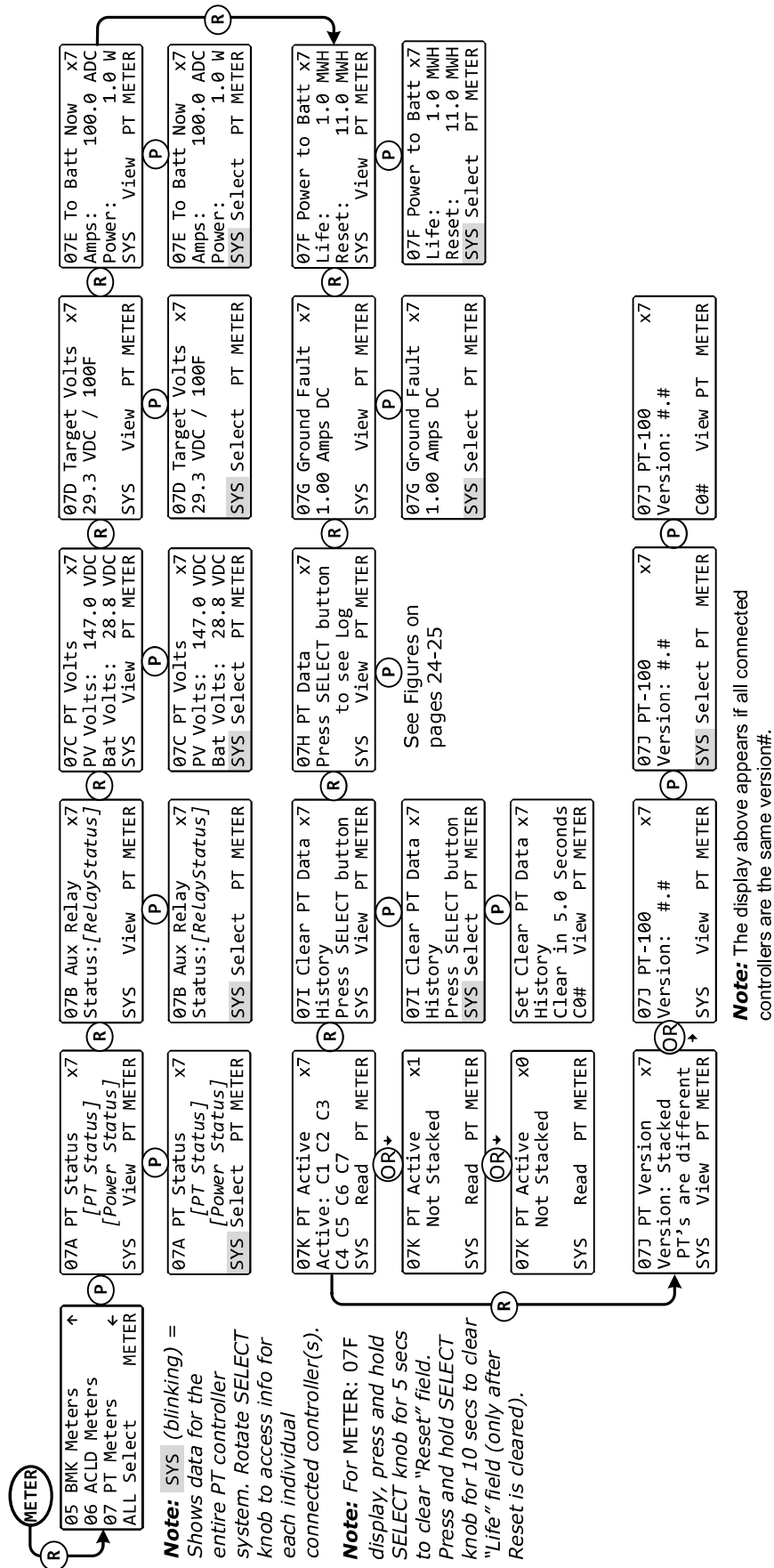
Symptom	Possible Cause	Solution
Display shows unrecognizable letters or symbols.	Static electricity may have been discharged into the LCD display.	Refresh Display: To refresh, press and hold the METER button until the System Home screen shows (~3 seconds).
LCD text display is locked-up, pressing any button has no response.	The connections on the ends of the communication cable are not making a good contact.	Reset router: 1) Disconnect router cable from inverter for 5 seconds and reconnect; 2) Check cable connections on the router. Important: Ensure the RJ14 connector is pushed into the correct port. You should feel/hear "click" when connecting.
	Router not getting sufficient power from inverter.	Ensure the inverter batteries are connected and the inverter is operating correctly. Inverter should be able to invert and power AC loads from batteries (ensure no AC power is connected to the inverter's AC inputs).
LEDs and backlight are off.	Router is in Power Save mode.	Press any button to reactivate router (or turn Power Save mode to <i>OFF</i> to keep the LEDs and backlight on).
Router is non-functional (no lights, no text on LCD display, and no response when pressing any button).	Communication cable bad or not correctly connected from remote (or network) port on inverter to a remote port on router.	Check communications cable from inverter to router, ensure: 1) It is connected to the router remote port on one end and the other end is connected to the Remote (or Network) port on the inverter. 2) The correct communications cable is used (a 4-conductor telephone cable may be substituted to determine if cable is good).
	Inverter is dead (i.e., not powered or connected to batteries).	Ensure inverter batteries are connected and inverter is operating correctly without any AC input power connected (can invert and power AC loads from batteries).







Note: C0# (blinking) = Shows data for the PT controller (per the assigned DIP switch number inside that PT) that appears on the router's display (lower left). Rotate the SELECT knob to view/edit data for any additional connected controller(s). If only one controller connected, "SYS" appears in lower left for 05B, 05C, and 05D menu displays.



Accessing System PT Data History

<p>07H PT Data x7 Press SELECT button to see Log SYS View PT METER</p>		<p>Rotate SELECT knob to access PT data for additional connected controllers (C01-C07).</p>		<p>Rotate SELECT knob to access subsequent system data for past days 002-255.</p>	
<p>Today's Work x7 Harvest: 012.0 kWh On Time: 10.2 Hrs SYS View PT METER</p>	<p>Today's Work x7 Harvest: 012.0 kWh On Time: 10.2 Hrs SYS Select PT METER</p>	<p>Today's Work x7 Harvest: 012.0 kWh On Time: 10.2 Hrs SYS edit PT METER</p>	<p>Today's Work x7 Harvest: No Data On Time: No Data SYS EDIT PT METER</p>	<p>Day-001 Work x7 Harvest: No Data On Time: No Data SYS View PT METER</p>	<p>Day-001 Work x7 Harvest: No Data On Time: No Data SYS View PT METER</p>
<p>Today's Max PV x7 VDC: 147VDC/12:00A Power: 12.0kW/12:00A SYS View PT METER</p>	<p>Today's Max PV x7 VDC: 147VDC/12:00A Power: 12.0kW/12:00A SYS Select PT METER</p>	<p>Today's Max PV x7 VDC: 147VDC/12:00A Power: 12.0kW/12:00A SYS edit PT METER</p>	<p>Day-001 Max PV x7 VDC: No Data Power: No Data SYS EDIT PT METER</p>	<p>Day-001 Max PV x7 VDC: No Data Power: No Data SYS View PT METER</p>	<p>Day-001 Max PV x7 VDC: No Data Power: No Data SYS View PT METER</p>
<p>Today's Battery x7 Max: 29.4VDC/12:00A Min: 23.4VDC/12:01A SYS View PT METER</p>	<p>Today's Battery x7 Max: 29.4VDC/12:00A Min: 23.4VDC/12:01A SYS Select PT METER</p>	<p>Today's Battery x7 Max: 29.4VDC/12:00A Min: 23.4VDC/12:01A SYS edit PT METER</p>	<p>Day-001 Battery x7 Max: No Data Min: No Data SYS EDIT PT METER</p>	<p>Day-001 Battery x7 Max: No Data Min: No Data SYS View PT METER</p>	<p>Day-001 Battery x7 Max: No Data Min: No Data SYS View PT METER</p>
<p>Today's AmpHrs x7 To Battery: 12500 AH SYS View PT METER</p>	<p>Today's AmpHrs x7 To Battery: 12500 AH SYS Select PT METER</p>	<p>Today's AmpHrs x7 To Battery: 12500 AH SYS edit PT METER</p>	<p>Day-001 AmpHrs x7 To Battery: No Data SYS EDIT PT METER</p>	<p>Day-001 AmpHrs x7 To Battery: No Data SYS View PT METER</p>	<p>Day-001 AmpHrs x7 To Battery: No Data SYS View PT METER</p>

KEY:

- Shaded areas denote active fields that you can change by turning the SELECT knob.
- P** = PRESS the SELECT knob
- R** = ROTATE the SELECT knob

Note: Press and hold the METER button at any time when in the PT Data Matrix to return to the *METER: 7H PT Data* menu.

(blinking): Rotate the SELECT knob to access/view data for any additional controllers in your system, or to change the particular field that is blinking on the display.

Accessing Individual PT Data History

