MAGNUM ENERGY

ME-AGS-N

Automatic Generator Start for Network Versions

Owner's Manual
Version ≥5.0

For use with the following remote controls:
ME-RC Revisions 1.5 – 2.612
ME-ARC Revisions 2.0 – 2.4
ME-RTR Revisions 2.1 – 2.2

Disclaimer of Liability

Since the use of this manual and the conditions or methods of installation, operation, use and maintenance of the ME-AGS-N (Auto Generator Start - Network) is beyond the control of Magnum Energy, Inc., this company does not assume responsibility and expressly disclaims liability for loss, damage or expense, whether direct, indirect, consequential or incidental, arising out of or anyway connected with such installation, operation, use, or maintenance.

Note as well that while every precaution has been taken to ensure the accuracy of the contents of this manual, the specifications and product functionality may change without notice. Magnum Energy, Inc. assumes no responsibility for errors or omissions.

Restrictions on Use

The ME-AGS-N may only be used in life-support devices or systems with the express written approval of Magnum Energy, Inc. Failure of the ME-AGS-N can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. If the ME-AGS-N fails, it is reasonable to assume that the health of the user or other persons may be endangered.

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Document Information

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This manual is printed without color for cost savings. However, this entire manual is available for download under the Document Library tab at www.magnumenergy.com with many of the diagrams available in color.

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Statement of Appreciation

From all of us at Magnum Energy –

Thank you for purchasing this AGS module (ME-AGS-N).

We understand that you have many purchasing options in the marketplace, and are pleased that you have decided on a Magnum Energy product. This AGS module was proudly assembled and tested in the United States in our Everett, Washington, facility.

At Magnum we are committed to providing you with quality products and services, and hope that your experience with us is pleasant and professional.

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Important Safety Instructions

This manual contains safety instructions that must be followed during the installation and operation of this product. Read all instructions and safety information contained in this manual before installing or using this product.

Safety Symbols

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

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

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

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

Remedy: Symbol provides possible solutions for related issues.

Product Safety Alerts

WARNING:

- All electrical work must be performed in accordance with local, state, and federal electrical codes.
- This product is designed for indoor/compartment installation – do not expose to rain, snow, moisture, or liquids of any type.
- Use insulated tools to reduce the chance of electrical shock or accidental short circuits.

WARNING: Severe personal injury, death, and equipment damage can result from operating the generator in a garage, building, or confined space. The generator produces dangerous fumes when it is running. If the generator is installed in an RV, disable the AGS system to prevent the generator from starting when the RV is in a garage, building, or a confined space.

WARNING: ENGINE EXHAUST GASSES CAN BE DEADLY. Install a reliable carbon monoxide alarm in your vehicle, building, or home before starting a generator or enabling the AGS. All engine exhaust contains carbon monoxide: an odorless, colorless gas that can cause severe personal injury or death. Symptoms of CO poisoning include:

- Dizziness, headache or throbbing temples
- Weakness or muscular twitching
- Sleepiness or confusion
- Nausea or vomiting

If you experience any of these symptoms, get to fresh air immediately. If symptoms persist, seek medical attention. Shut down the generator and do not operate until the unit is inspected and repaired.

WARNING: With an Automatic Generator Starting system installed; exhaust CO, electrical shock, and moving parts hazards are possible due to unexpected engine-generator starting. Disconnect the engine-generator starting battery cables or the AGS connection to the engine-generator before working on the generator or any other electrical system powered by the generator.

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1.0 Introduction

Congratulations on purchasing your ME-AGS-N. The ME-AGS-N is the 'network' version of Magnum Energy's Automatic Generator Start (AGS) modules. This AGS is set up and operated via a Magnum Energy inverter and remote control (i.e., ME-RC, ME-ARC, or ME-RTR). Using the AGS, your generator can automatically start and stop based on the following conditions:

- **Battery Voltage:** Continuously monitors battery voltage. Autostarts the generator when the battery voltage falls to a certain level, and autostops the generator when the battery voltage either rises to a higher level or goes into the Float Charge stage – depending on the remote control.
- **Time of Day:** Starts and stops the generator daily based on selectable start/stop times (determined by the time on the remote control's clock).
- **Inverter Load Amps:** Starts/stops the generator based on the loads powered by the inverter (assists inverter with larger loads).

  Note: Only applicable to MS-PAE and MS-PE Series Magnum inverters.
- **Rising Temperature:** Continuously monitors the temperature of the surrounding area and automatically starts the generator whenever power is needed to run an air conditioner or to cool down an area.
- **Battery SOC:** Monitors your battery system and automatically starts the generator when the battery requires charging – based on the actual SOC (State of Charge) of the battery.

  Note: Battery SOC is a more accurate method than using battery voltage as a criteria to determine when a battery requires charging.

Info: The SOC autostart/autostop feature requires the optional ME-BMK or ME-BMK-NS (Battery Monitor Kit) accessory to accurately determine the battery's SOC.

1.1 ME-AGS-N Module

Info: This manual is for the ME-AGS-N with a software revision of 5.0 or higher. Refer to your Magnum remote control manual or the remote control's specific section in this manual for assistance in determining the AGS's software revision#.

Info: If you require an AGS module, but are not using a Magnum inverter/charger, use the **ME-AGS-S** (AGS – Standalone version).

The AGS is compatible with most AC or DC generators with either 2-wire or 3-wire start controls, such as: Onan, Generac, Martin, Kohler, Honda, Yamaha, and many others. A list of generators that have been successfully used with the AGS (and their respective wiring diagrams) can be found at:

http://www.magnumenergy.com/service/genwiringdiagrams.htm

The AGS is equipped with the following operational features:

- Allows manual on and off control (ME-ARC and ME-RTR only) and automatic control of generator
- Compatible with 12, 24, or 48-volt systems
- Easily adjustable settings using the inverter's remote control menus (i.e., ME-RC, ME-ARC, or ME-RTR)
- Quiet Time setting to prevent generator operation during nighttime hours

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- TEST button immediately confirms if installation wiring correct
- Removable 8-port terminal block for easy wiring and powering down
- Front panel LED indicators for gen start/stop status and gen fault

1.2 ME-AGS-N System Requirements

The AGS requires several other components to operate correctly.

Automatic Start Generator – The generator should have automatic starting capability. The generator must have start and stop controls [i.e., an electric starter and electric choke (for gasoline units)], and the safety sensors to be able to start and stop automatically. These safety items include: low oil pressure, high temperature, engine start over-crank, over/under frequency (speed), low coolant level, etc. The generator should also supply a "generator run signal", which the AGS uses to detect whether the generator is running. The generator run signal must be from 10 to 40 volts DC, and can be provided from a generator hour meter signal or a switched B+ terminal.

Info: A generator run signal is not required when using Gen Type: 2-Wire Standby Mode and an AGS with a revision of 5.2 or higher.

Remote Control – A separate remote control (i.e., ME-RC, ME-ARC, or ME-RTR) is required to configure the AGS and to monitor generator starting and stopping activity. Some of the more advanced generator start/stop features are not available on the standard ME-RC and require the ME-ARC or ME-RTR advanced controllers. Refer to your Magnum remote control manual or the remote control's specific section in this manual to determine your available AGS autostart and autostop features.

Magnum Inverter – A Magnum inverter is required to communicate network information from the Magnum remote control to the AGS. The inverter must also have the internal software to work with the remote control and to allow the desired AGS feature. See Section 7.1 for help in determining your inverter's compatibility level.

1.3 ME-AGS-N Components

The ME-AGS-N is shipped with the following:

- AGS module
- Remote Temp Sensor cable
- Warning label
- Network Communications cable
- ME-AGS-N Owner's Manual
- Mounting screws (x4)

1.3.1 ME-AGS-N Features

The AGS module provides the generator's wiring connections and the following components (refer to Figure 1-1):

1. **STATUS Indicator** – a bi-color (green or red) LED indicator that illuminates to provide information on the AGS's operation.
2. **TEST Button** – a momentary pushbutton that allows the AGS system to be tested for correct wiring and generator start/stop operation.
3. **Wiring Terminal Block** – an 8-port friction-fit connector that powers the AGS and connects the generator's start/stop and run sense wires.
4. **Mounting Flange** – used to secure the AGS to a shelf or a wall. Four black oxide #8 x 3/4 Phillips drive, Pan head screws are provided to mount the AGS.

5 **READY Indicator** – a green LED indicator that illuminates to signal that the AGS is powered (blinks if the optional temp sensor is not connected).

6 **NETWORK Connection Port (green label)** – a RJ14 port (6P4C - 6 position, 4-contact female connection) which provides the connection point for the network communication cable.

7 **REMOTE Connection Port (purple label)** – a RJ14 port (6P4C - 6 position, 4-contact female connection) that provides the connection point for the remote temperature sensor cable (see Figure 1-2).

8 **Internal Access Screws** – four #6-32 x 3/8 Phillips screws that must be removed to access the DC Input Jumper and the 4-position DIP Switch.

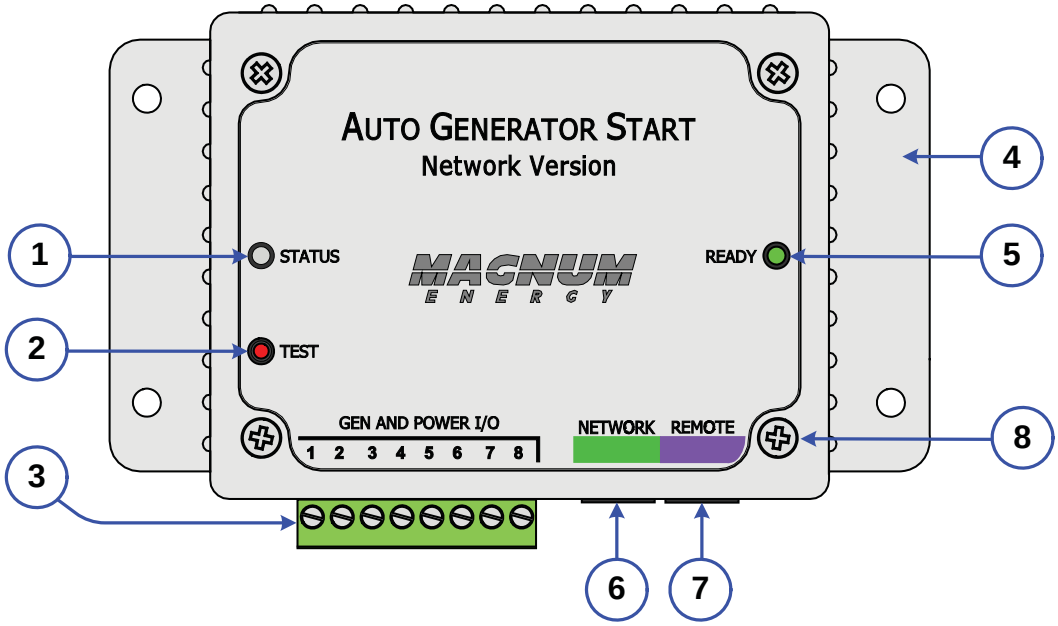

Figure 1-1, Components of the ME-AGS-N Module

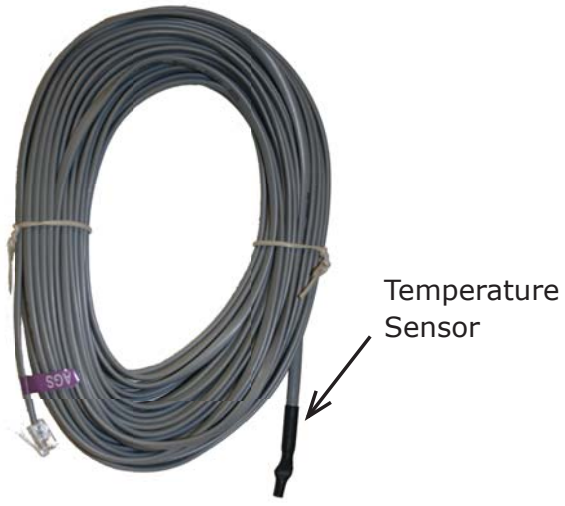

Figure 1-2, Remote Temp Sensor Cable (60 ft.)

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2.0 Installation

Installing the AGS is a simple process. Before installing, read this entire section so you can thoroughly plan the details to ensure the overall system requirements are accomplished. To assist you in planning and designing your installation, review the basic system diagram shown in Figure 2-1.

WARNING: The AGS is not an ignition-protection rated device and should not be installed in any location that requires ignition-protected equipment. To prevent fire or explosion, do not install the AGS module in any area with extremely flammable liquids like gasoline or propane, or in an area that contains connections between components of a fuel system.

CAUTION: Installations should be performed by qualified personnel, such as a licensed or certified electrician. It is the installer's responsibility to determine which safety codes apply and to ensure that all applicable installation requirements are followed. Applicable installation codes vary depending on the specific location and application.

CAUTION: Review the "Important Safety Instructions" in the front of this manual before any installation.

2.1 Installation Requirements

Review the following requirements prior to performing the installation:

- For the AGS to automatically start and stop the generator properly, the generator must include an electric start and an automatic choke. To prevent generator damage and to ensure reliable operation, use generator models designed for unattended operation. These models should also be equipped with remote operation connections and have protective systems that shut down the generator when low oil pressure, over-temperature, starter lockout, or over-crank conditions occur.
- The AGS is connected to a Magnum inverter by a 10-foot communications cable. Before installing the AGS and connecting any wires, first determine: 1) the communications cable route throughout the home or vehicle/boat from the AGS module to the inverter, 2) the start/stop signal wire route from the AGS module to the generator, and 3) the wire route from the AGS module to the monitored battery bank.
- Always check for existing electrical, plumbing, or other areas of potential damage BEFORE drilling or cutting into walls.
- If installing the AGS in a boat, RV or truck, ensure the conductors passing through walls, bulkheads, or other structural members are protected to minimize insulation damage such as chafing, which can be caused by vibration or constant rubbing.
- Do not mount the AGS module in a closed battery compartment or in an area where water (any liquid) can enter the AGS and cause shorting or corrosion.
- The AGS, if possible, should be wired so as not to interfere with the manual start/stop switches on your generator, or with your air conditioner controls if the high temp start feature is used to power the air conditioner.

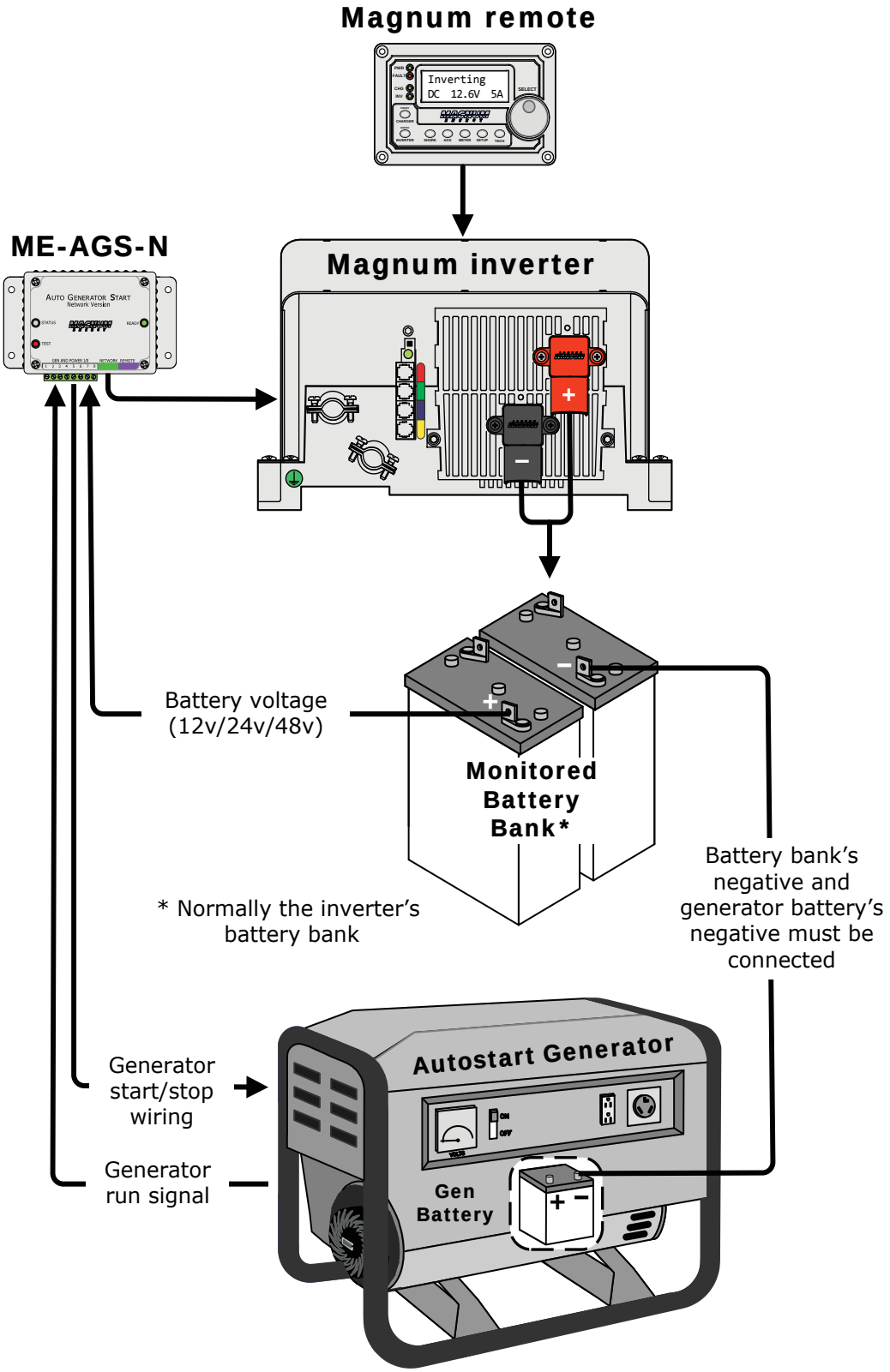

Figure 2-1, ME-AGS-N System Diagram

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2.2 Required Materials and Tools (not included)

To properly install the AGS module you will need to supply the following:

Required Materials

- 16 to 12 AWG wire for connecting the AGS to the generator start/stop circuit and to the battery bank
- In-line fuse holders (with a 5-amp DC fuse)

Required Tools

- Phillips screwdriver (#2)
- Flat-blade screwdrivers (1/4" and 1/8" blades)
- DC voltmeter
- Cut-out tool (knife/saw)
- Drill bits (7/64" & 1/8")
- Drill
- Wire stripper
- Pencil

2.3 Mounting Procedure

Select an inside mounting location that is clean, dry, and protected from extreme temperatures. Refer to Figure 2-2 for the AGS module's dimensions.

Info: The AGS module can be mounted in any direction. However, be sure to allow ample room to access the 8-port terminal block, and the NETWORK and REMOTE ports.

1. Remove the 8-port terminal block from the module (Figure 1-1, Item 3). The terminal block is friction-fit, remove by pulling it straight out.

   Note: Do not plug the terminal block back into the AGS module until the installation is complete and you are ready to perform the functional tests (per directions in Section 4.0).

2. Mount the AGS module using the supplied #8 x 3/4" screws (x4).

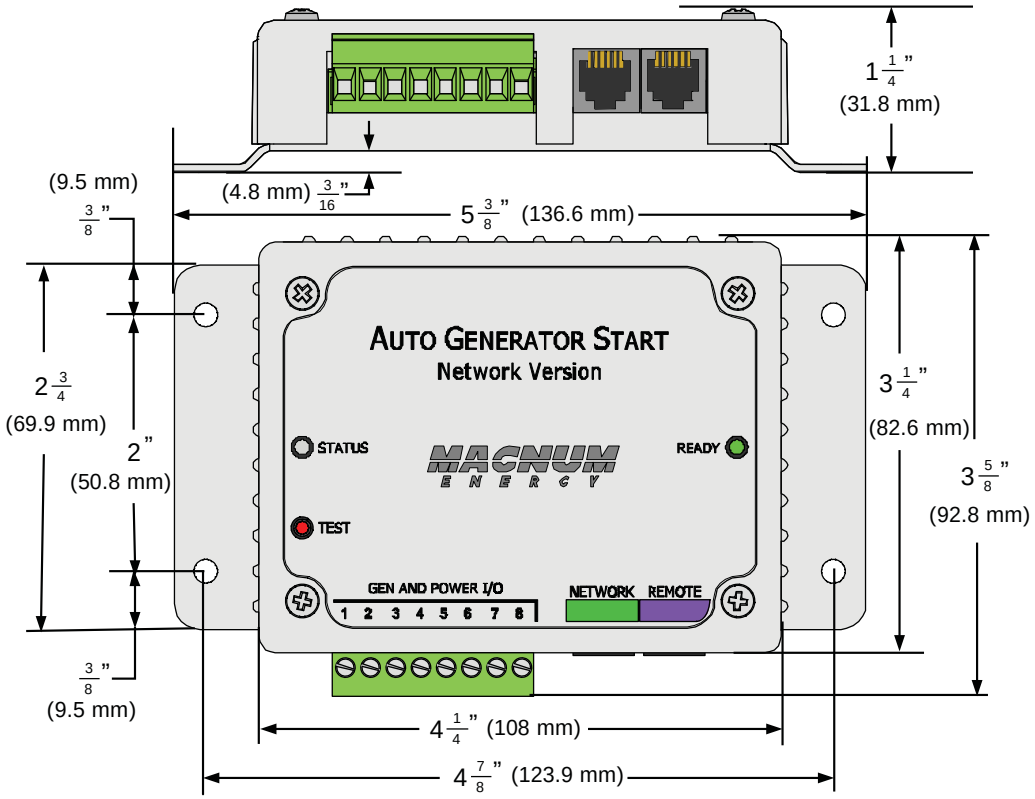

Figure 2-2, ME-AGS-N Dimensions

2.4 Connecting the Cables

The AGS comes with two cables: the temp sensor cable is required if using the temperature autostart feature; the network communication cable is required for communicating with the inverter/remote.

2.4.1 Connecting the Remote Temp Sensor Cable

If using the temperature autostart feature, connect the plug-in end of the temp sensor cable to the REMOTE (purple) port of the AGS module, and then place the other end (with sensor) in the area you wish to monitor (see Figure 2-3). The temp sensor cable is 60 feet long.

If you are not using the temperature autostart feature, the temp sensor cable does not need to be connected.

Note: The AGS's READY light will blink if the temp sensor cable is not connected – this is normal.

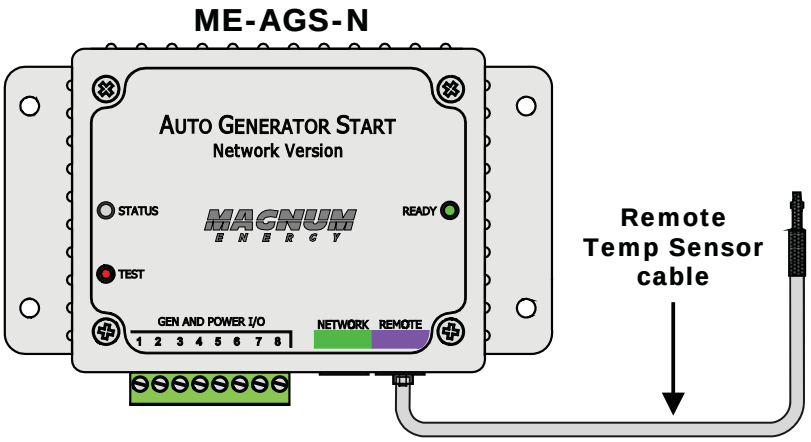

Figure 2-3, Remote Temp Sensor Connection

2.4.2 Connecting the Network Communication Cable

The network communication cable is a 10-foot, 4-conductor, flat, telephony standard with 6P4C (6-position/4-conductor) connectors on each end. When the 6P4C connectors are held side by side with both of the connector tabs facing the same way, the color of the conductors in each connector is the opposite from top to bottom (as shown in Figure 2-4).

Note: The network communication cable can be extended up to a length of 200 feet without data degradation.

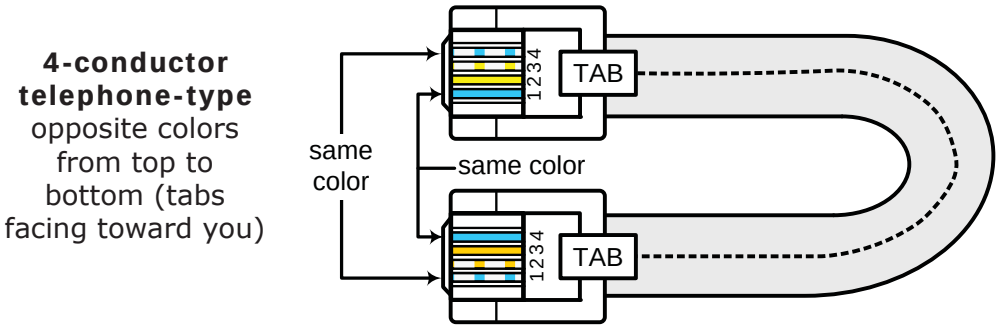

Figure 2-4, Network Communication Cable

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Connecting the AGS to a Magnum inverter: Connect one end of the communication cable to the AGS's RJ14 NETWORK (green) port, and then:

- **Small inverter (MM/MMS Series)** – connect the other end of the communication cable to a phone splitter, and then connect the splitter to the REMOTE (blue) port on the small Magnum inverter (see Figure 2-5); or,
- **Large inverter (ME, RD, MS, MS-PAE Series)** – connect the other end of the communication cable to the RJ14 Network port (green) on the large Magnum inverter (see Figure 2-6).

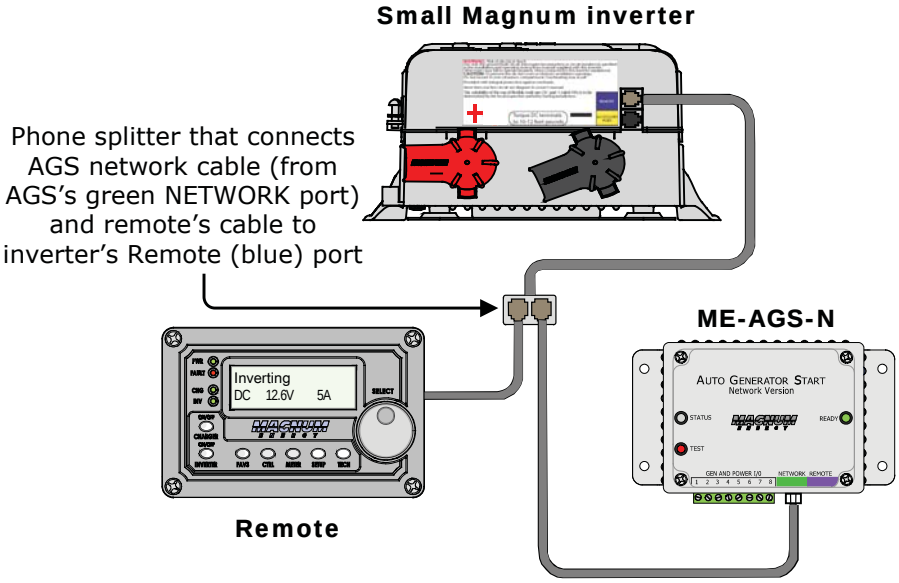

Figure 2-5, Connecting the AGS to a Magnum Inverter (Small)

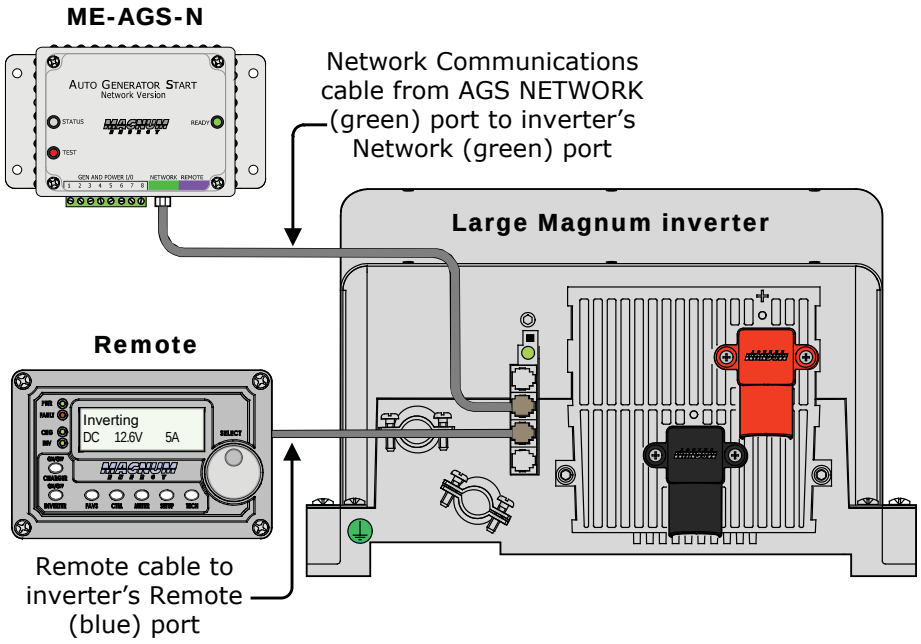

Figure 2-6, Connecting the AGS to a Magnum Inverter (Large)

2.4.3 Cable Connections with Multiple Devices

If you are using more than one Magnum networked device, a 4-wire phone splitter is required to connect the devices. There are two options for interconnecting the devices – either in a Star or Daisy Chain configuration.

Info: Before deciding on which configuration to use, review the differences in installation and ease of troubleshooting.

- **Star Configuration** – In this arrangement, all the network devices connect to the inverter's Network port via a phone splitter, using individual cable runs (Figure 2-7). Since each device is independently connected to the inverter's Magnum Net or Network port, problems in a cable or a device can be easily isolated; and, if there is a cable failure to one device it does not bring down all the devices.

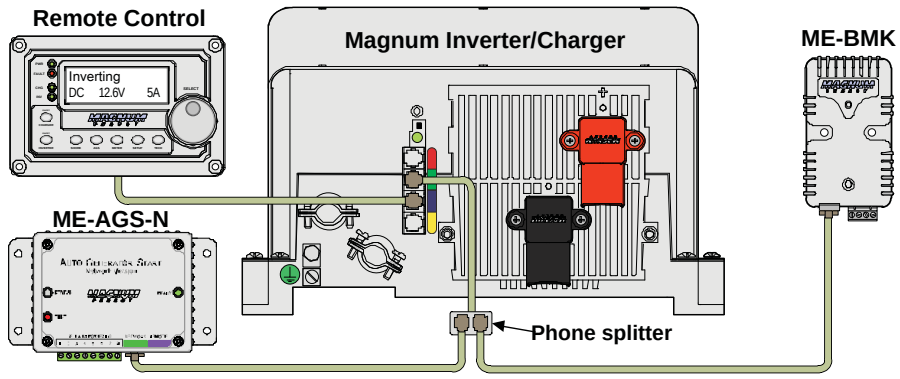

Figure 2-7, Multiple Network Devices – Star Configuration

- **Daisy Chain Configuration** – In this arrangement, the network devices are linked in a series (Figure 2-8). If using this configuration, the ME-AGS-N must be the first device connected to the inverter's Magnum Net or Network port – followed by the second network device.

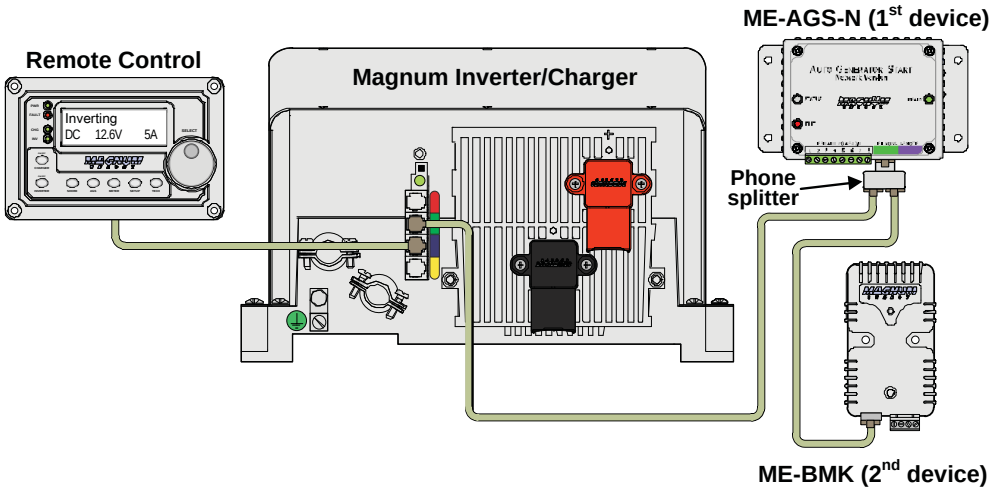

Figure 2-8, Multiple Network Devices – Daisy Chain Configuration

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2.4.4 Ensure all Negative Connections are Connected Together

When connecting devices together (via a network communication cable), the return path (i.e., battery negative) of each battery powered device must be at the same potential (i.e., electrically common with each other). This prevents a high-impedance path developing between the connected devices, which can cause the network cable to become the DC return path to the battery – possibly resulting in permanent damage to all connected devices on the network. This also requires that the battery negative connection of each device be always connected before connecting/disconnecting any battery positive.

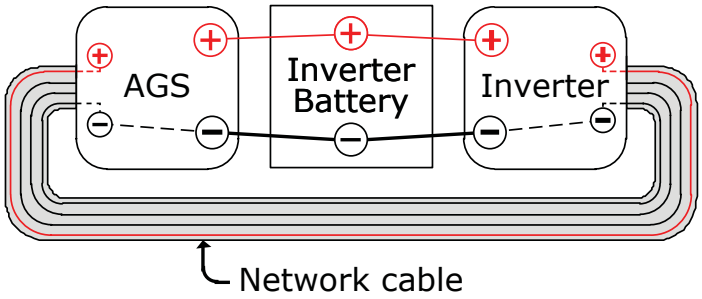

Figure 2-9, Connected Devices at the Same Potential

2.5 ME-AGS-N Terminal Block Wiring Connections

With the AGS already mounted, remove the green 8-port terminal block before proceeding with wiring the generator. Refer to Figure 2-11 and the info below to wire the AGS's terminal block to the generator.

CAUTION: DO NOT plug in the 8-port terminal block until all the wiring to the module is complete and you are ready to perform the functional tests (per instructions in Section 4.0).

CAUTION: A fuse rated at 5 amps or less must be used to protect all power circuits connected to the AGS (do not fuse ground connections). Ensure the fuse is correctly rated for the wire size used. Refer to national and local codes for rating and type. Normally, a minimum #16 AWG wire is required in order to use a 5-amp fuse.

Info: The green 8-port terminal block accepts CU/AL conductors from #30 to #12 AWG (0.05 to 3.3 mm^2).

2.5.1 Power Connections (Terminals 3 & 4)

Terminals #3 (positive) and #4 (negative) on the 8-port terminal block are connected to the monitored battery bank*. These terminals are used to power the AGS module and to monitor the inverter's battery voltage (when used to autostart the generator based on low battery voltage).

Info: The AGS requires a DC input of 8.5-70 volts in order to operate the internal relays. An input voltage greater than 70 volts will cause damage to the AGS and is not covered by the product warranty.

** Monitored Battery Bank – When autostarting the generator based on battery voltage (i.e., start VDC), the inverter's battery bank must be connected to Terminals #3 (positive) and #4 (negative). If autostarting based on any other condition (i.e., temperature, amps, etc.), either the inverter battery bank or the generator's battery may be used to power the AGS module. However, the negative terminal of every battery bank must be connected together to prevent damage to the AGS (see Section 2.4.4).*

To make power connections from the monitored battery bank to AGS:

1. Route and connect a wire (black) from the monitored battery bank's negative terminal to Terminal #4 on the 8-port terminal block.
2. Route and connect a wire (red) with a 5-amp in-line fuse from the monitored battery bank's positive terminal to Terminal #3.

2.5.2 Generator Run Sense Connection (Terminals 2 & 4)

A generator run sense signal/voltage is required as it alerts the AGS that the generator is running; which prevents another starter crank to the generator. If the gen run sense signal is not provided to the AGS, the AGS commands the generator to autostop (in case the generator is actually running), and then attempts another autostart sequence (up to four start attempts before a gen start fault occurs). The Gen Type switch setting (under Section 3.1) determines the required gen run sense signal/voltage that must be provided to the AGS.

- **Gen Type is 2-Wire Standby Mode*** – If your generator is fully automatic and can start, run, and stop using only two wires, you may be able to use the 2-Wire Standby setting (see Gen Type settings under Section 3.1). When using this setting, the gen run sense signal is communicated from the inverter to the AGS thru the network cable. The AGS determines that the generator is running when the inverter/charger communicates that it is in a charge state (i.e., Charging, Bulk Charge, Absorb Charge, etc.).

  ***** *Requires ME-AGS-N with revision ≥5.2 to use 2-Wire Standby mode.*

  When using the 2-Wire Standby setting (and the generator is autostarted by the AGS), the generator runs and connects to the input of the inverter. This causes the inverter to begin charging, which in turn communicates to the AGS (via the network cable) that the generator is running – preventing another starter crank command from the AGS.
- **Gen Type is not 2-Wire Standby Mode** – For all other Gen Type settings (other than 2-Wire Standby mode), the generator run sense must be 10 to 40 VDC – only while the generator is running. The gen run sense voltage from the generator is connected to Terminal #2 (positive) and Terminal #4 (negative) on the green 8-port terminal block on the AGS; and can be a switched B+ source from the generator, a positive signal from the generator's hour meter, or the generator's running light.

To install the generator's run sense voltage to the AGS:

1. Connect a wire (preferably not black or red) from the generator's run sense output to Terminal #2 on the 8-port terminal block.
2. Connect the negative terminal of the monitored battery bank to Terminal #4 (power negative) on the 8-port terminal block. Ensure the negative terminal on the generator battery is referenced/connected to the negative terminal on the monitored battery.

Info: The negative terminal of the monitored battery bank must be in common with the negative side of the gen run sense signal from the generator. This ensures that the positive battery voltage (to Terminal #3) and the positive gen run sense voltage (to Terminal #2) have a common negative reference (to Terminal #4), and are correctly sensed/measured by the AGS.

What if my generator does not have a gen run sense output? If your generator is not equipped with a generator run sense output (10 to 40 VDC - only while the generator is running), review the alternative options as shown in Figure 2-10 to provide this gen run sense voltage to the AGS.

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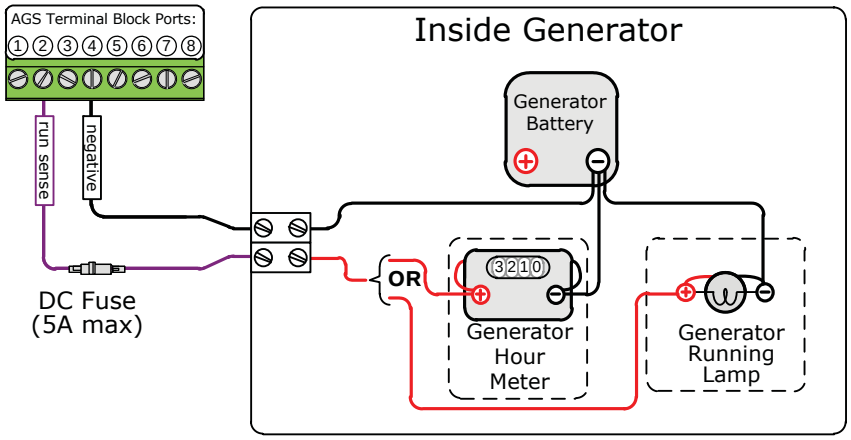
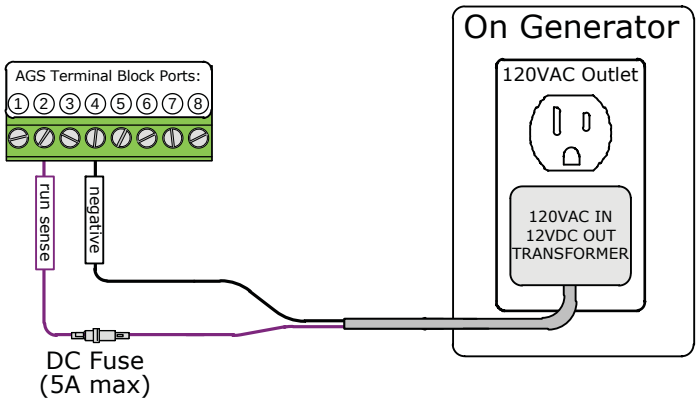
Alternative Option 1 – Tap into the positive side of the generator's hour meter or running lamp; ensure the voltage is 10 to 40 VDC only while the generator is running.



Alternative Option 2 – Use a 120 VAC to 12 VDC step-down transformer (normally used to charge power equipment batteries) and plug it into the generator's 120 VAC output. The step-down transformer provides 12 VDC output only while the generator is running.



Alternative Option 3 – Use an external 120 VAC coiled relay to bring the generator's battery voltage to the AGS gen run sense terminal (AGS terminal block – Terminal #2) only while the generator is running. The generator's battery voltage must be 10 to 40 VDC.

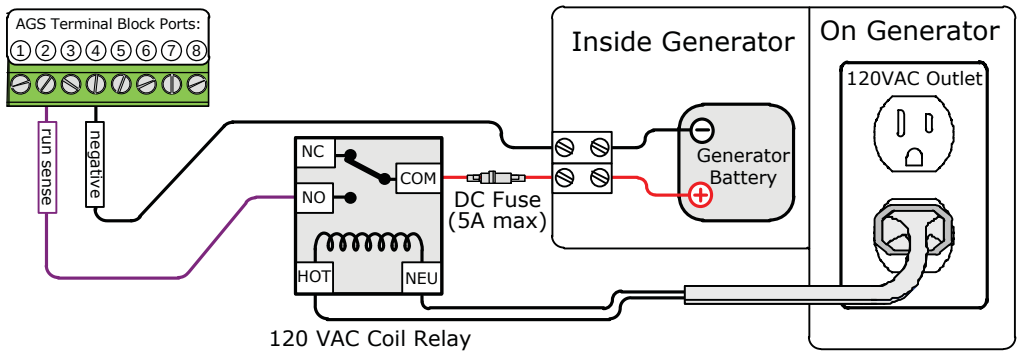


Figure 2-10, Generator Run Sense Options

2.5.3 Gen Start / Stop Connections (Terminals 1, 5, 6, 7, & 8)

This section covers the control relays inside the AGS module, and provides information about wiring these relays to the generator's start/stop circuit. You must identify the generator's start and stop wiring requirements in order to determine: how many relays you require, the number of wires you connect, and in what combination.

When the generator is equipped with a remote control terminal or connector, it is much easier to make the connections to the AGS control relays if the generator's optional remote control is purchased. Connecting to the generator's remote also eliminates the need to make connections inside the generator (and possibly violating the generator's warranty).

The AGS module provides three control relays (RY1, RY2, and RY3) to operate the autostart/autostop functions of your generator. These relays are dry contacts (they do not provide any voltage or current), and operate only as switches that turn low amperage devices (≤5 amps) on and off. They are not intended to directly provide power to starter motors or to ignition systems. Rather, the relays are used to send a signal to operate the coil of another higher amperage device, which does the actual switching of power.

CAUTION: A fuse rated at 5 amps or less must be used to protect each of the relays. **The warranty does not cover damage to these relays.** Fuses should be located as close as possible to the generator connection. 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.

Info: To set the generator type — which determines the operation of the AGS relays — see the Gen Type setting info in Section 3.1.

Info: Due to the different generator types and the various starting/stopping wiring configurations used by generator manufacturers, detailed wiring instructions are not provided in this manual. Please refer to your generator's documentation for wiring details.

Info: For more information, and to view diagrams on connecting the AGS to the start/stop circuit on many generators, go to http://www.magnumenergy.com/service/genwiringdiagrams.htm.

Depending on your generator's start and stop wiring requirements, you may only need to use one relay (RY1) for fully automatic 2-wire generators; two relays (RY1 and RY2) for 3-wire generators; or all three relays (RY1, RY2, RY3) for generators that require an independent bypass or preheat circuit.

The connection points to each relay are as follows (see Figure 2-11):

- **Relay 1 (RY1) and Relay 2 (RY2)**

  Terminal #5: the Normally Open (N.O.) position of the RY1 relay

  Terminal #6: the Common (COM) position of both Relay 1 (RY1) and Relay 2 (RY2)

  Terminal #7: the Normally Open (N.O.) position of Relay 2 (RY2)

- **Relay 3 (RY3)**

  Terminal #1: the Common (COM) position of Relay 3 (RY3)

  Terminal #8: the Normally Open (N.O.) position of Relay 3 (RY3)

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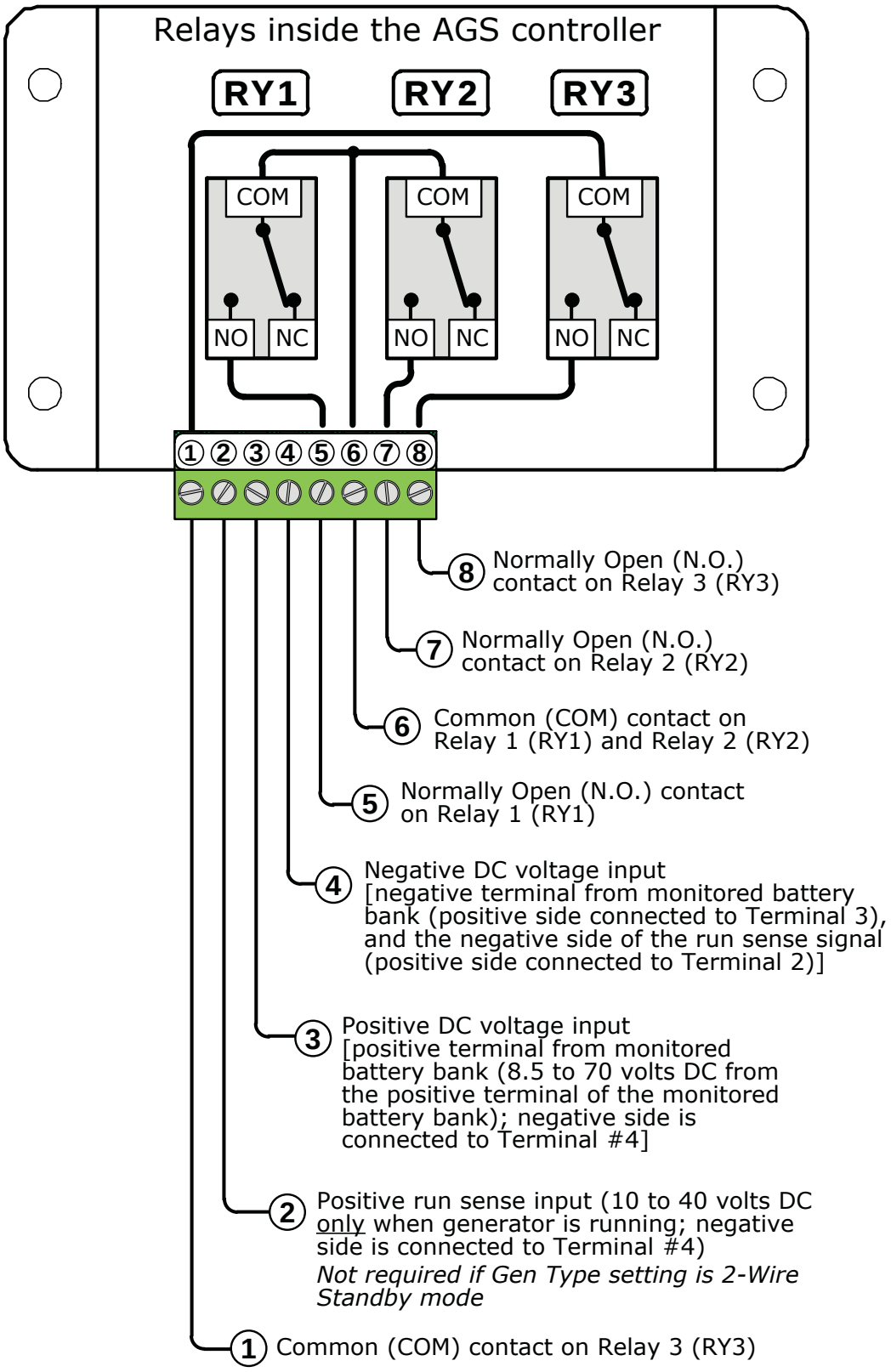

Figure 2-11, Wiring to the ME-AGS-N Module's Terminal Block

2.6 Common Generator Wiring Diagrams

The most common generator starting/run/stop circuits can be divided into three major types – 2-wire control, 3-wire momentary control, or 3-wire maintain control. The following gen wiring diagrams are provided as examples:

Info: The term "3-wire" refers to the minimum number of wires required to control the starter motor and to run the generator; more than three wires may actually be needed.

Two-wire control generator types: These generator types integrate the control circuits for start-up, running, and stopping (Figure 2-13). The generator starts and runs when two control wires are connected, and then stops when they are disconnected.

Three-wire momentary control generator types: These generator types use a three-position momentary type switch that controls their operation (Figure 2-14). To start the generator, the switch is momentarily held in the START position. This energizes the ignition system and cranks the starter motor. Once the engine has started, the switch is released and it returns to a center position (i.e., "momentary" run control). To shut down the generator, the switch is held in the STOP position until the engine dies. Once the switch is released, it returns to the center position (i.e., "momentary" stop control).

Three-wire maintain control generator types: These generator types use an automotive type starting circuit (Figure 2-15). To start the generator, an operating switch is first turned to a RUN position and then momentarily held to a START position. Once the engine starts, the switch is released and it returns to the RUN position (i.e., "maintain" run control). To shut down the generator, the switch is moved to the OFF position (i.e., "maintain" stop control).

2.7 Warning Label

It might be falsely assumed that it is safe to perform maintenance on the generator or the electrical panel once the generator is off. However, the AGS system can automatically turn on the generator and power the panel.

A warning label (Figure 2-12) is provided to inform all personnel that an automatic generator starting device is installed in your electrical system. Place the label in a clearly visible location at the generator (ensure it is especially visible at the generator cabinet or at the enclosure that guards electrical shock or moving parts hazards).

WARNING: To prevent harm to servicing personnel, ensure the generator and AGS are properly disabled (i.e., remove the starting battery from the generator, and remove all power to the AGS by unplugging the green 8-port terminal block from the AGS module) prior to performing maintenance on the generator or electrical panel.

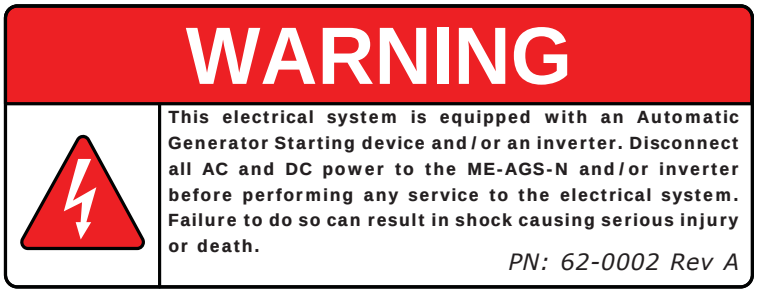

Figure 2-12, Warning Label

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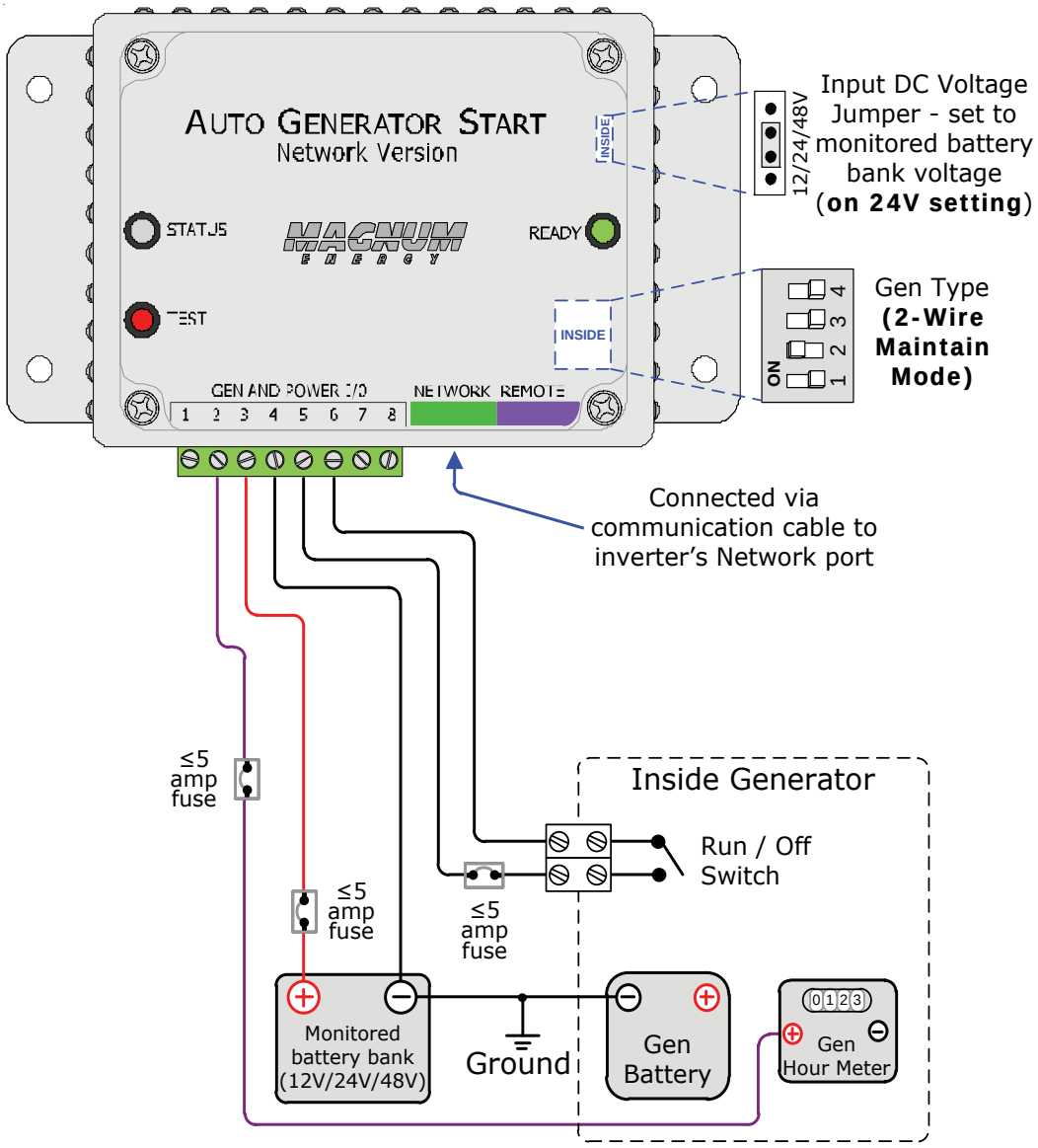
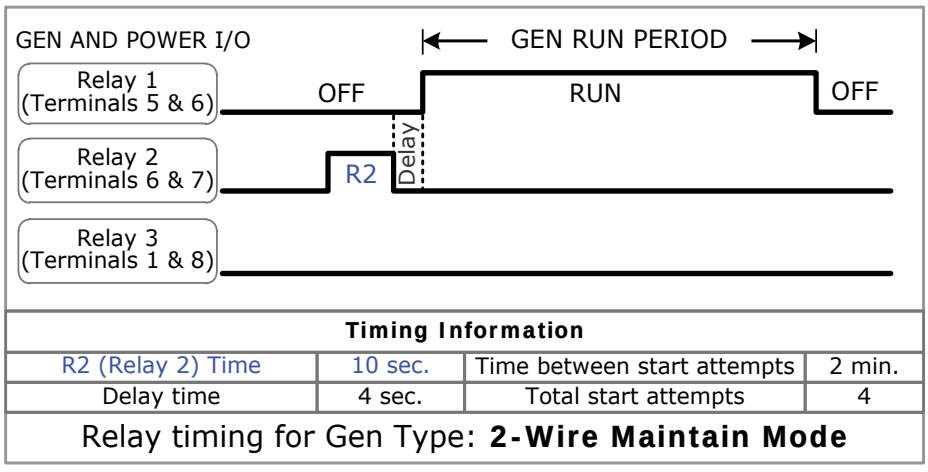
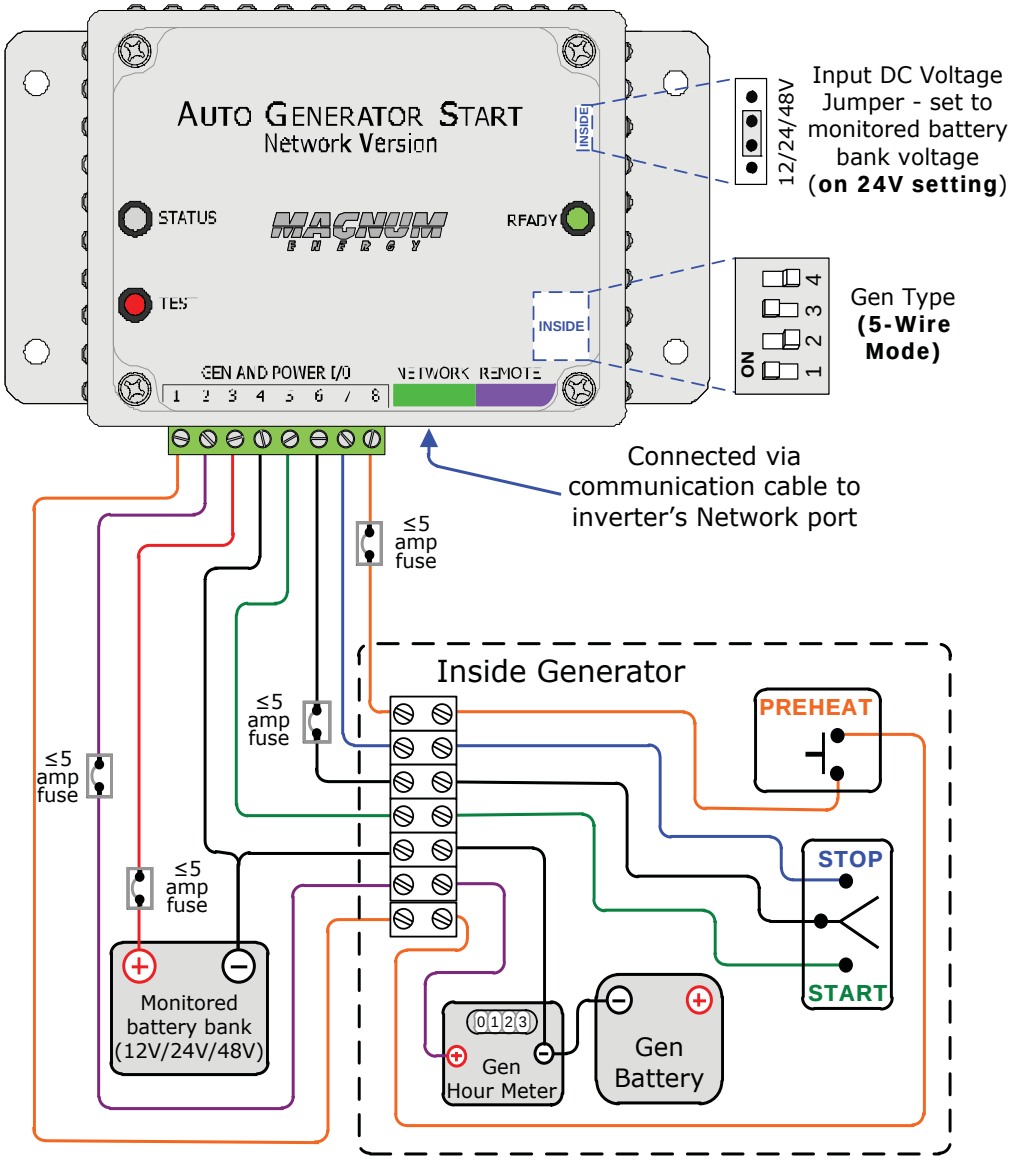


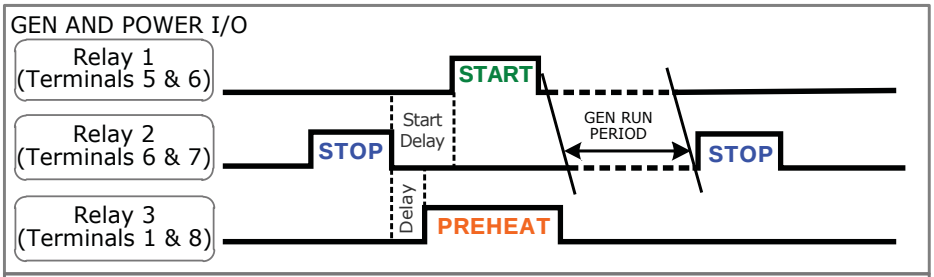


Timing Information			
R2 (Relay 2) Time	10 sec.	Time between start attempts	2 min.
Delay time	4 sec.	Total start attempts	4

Relay timing for Gen Type: **2-Wire Maintain Mode**

Figure 2-13, Two-wire Control Type Generators





Timing Information			
STOP Time	10 sec.	Preheat delay time	4 sec.
START Time	10 sec.	Time between start attempts	2 min.
PREHEAT Time	25 sec.	Total start attempts	4
Start Delay Time	14 sec.		

Relay timing for Gen Type: **5-Wire Mode**

Figure 2-14, Three-wire Momentary Control Type Generators

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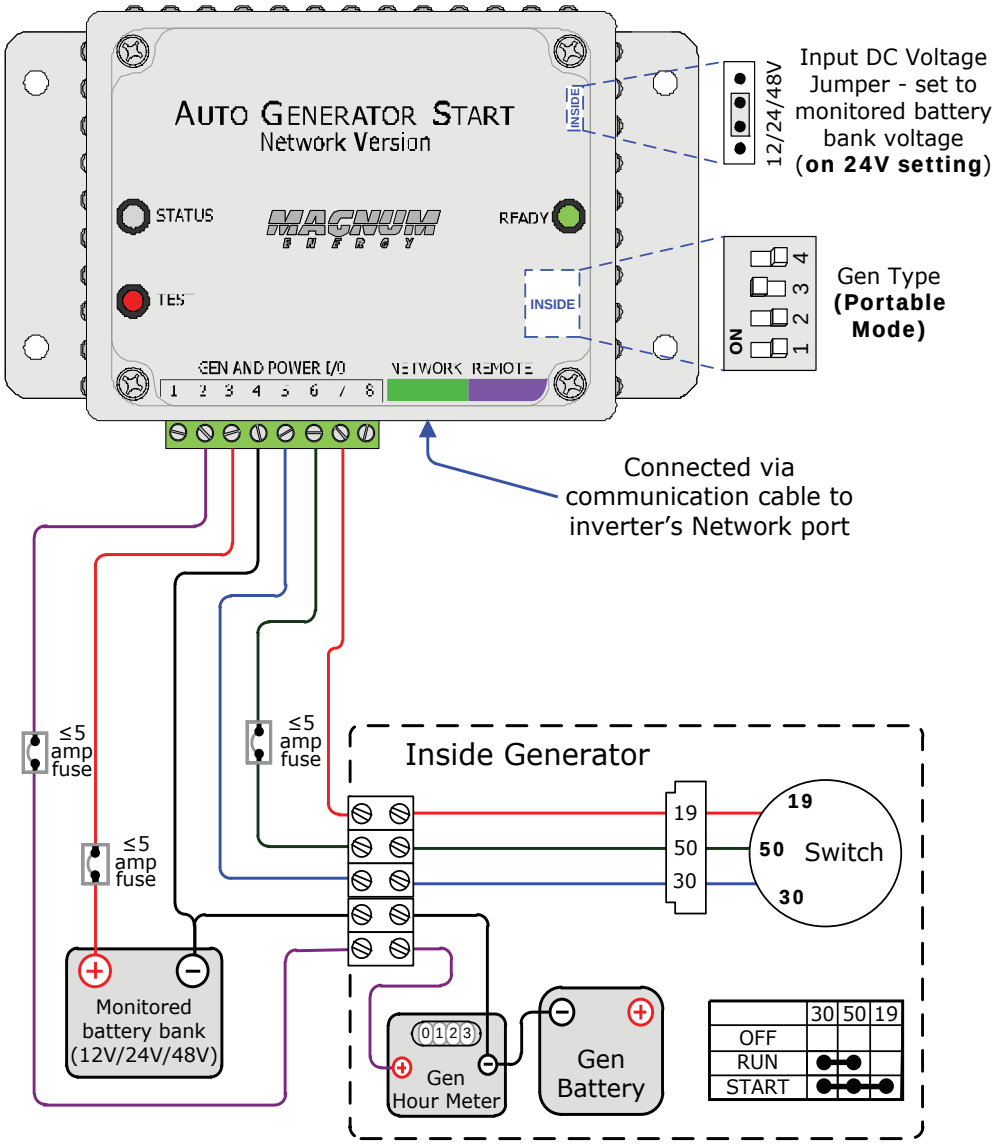

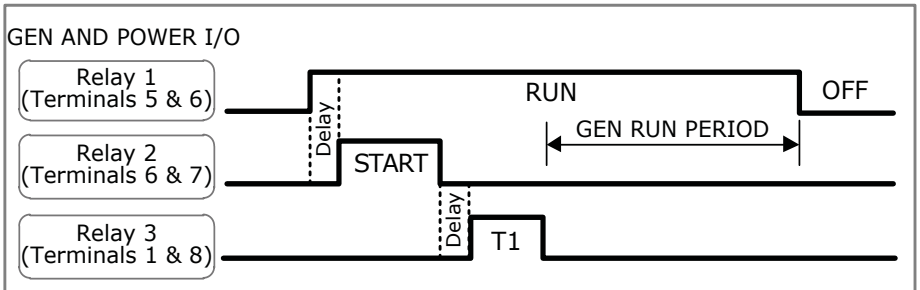

Timing Information			
START Time	10 sec.	Time between start attempts	2 min.
T1 Time	5 sec.	Total start attempts	4
Delay Time	2 sec.		

Relay timing for Gen Type: **Portable Mode**

Figure 2-15, Three-wire Maintain Control Type Generators

3.0 ME-AGS-N Module Setup

This section covers the AGS's internal settings and how to configure them.

3.1 Configuring the Internal ME-AGS-N Settings

Unscrew the AGS module's four top screws and remove the plastic cover to access the Input DC Voltage Jumper and the 4-position DIP (Dual In-line Package) switch (Figure 3-1).

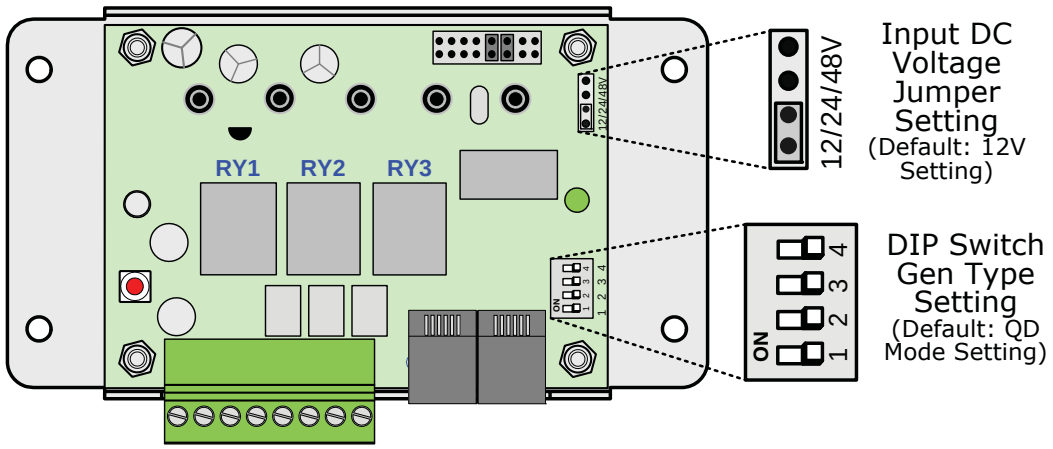

Figure 3-1, Inside the ME-AGS-N Module

Input DC Voltage Jumper Setting – This setting is determined by connecting two small pins with a small, black plastic box (i.e., jumper). This setting can be configured for 12, 24 or 48 VDC operation (Figure 3-2), which is determined by the nominal DC voltage connected to Terminals #3 and #4 on the AGS.

- For 12-volt DC operation, position the jumper on the bottom two pins.
- For 24-volt DC operation, position the jumper on the middle two pins.
- For 48-volt DC operation, position the jumper on the top two pins.

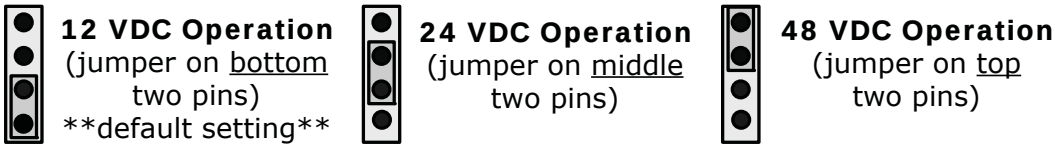

Figure 3-2, DC Voltage Settings

DIP Switch Gen Type Setting – The Gen Type setting is determined by a DIP switch, which is actually four small switches that can be turned to the ON or OFF positions. The position of each of these switches is used to determine the open and close timing sequence for the three internal AGS relays (RY1, RY2 and RY3). The multiple positions of the DIP switch allow a wide range of generator start/stop circuit configurations.

After determining the appropriate start/stop timing sequence for your generator, use Table 3-1 to determine the correct Gen Type setting for your generator's start/stop requirements.

For examples and further assistance, view the generator wiring diagrams at: http://www.magnumenergy.com/service/genwiringdiagrams.htm.

Info: This switch is shipped with a thin yellow plastic film covering. You can just punch through this thin film to set your gen type.

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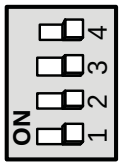
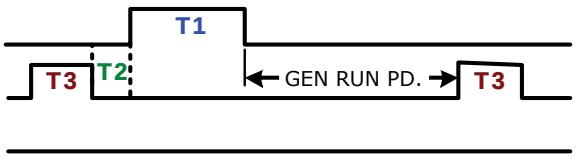
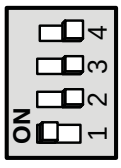
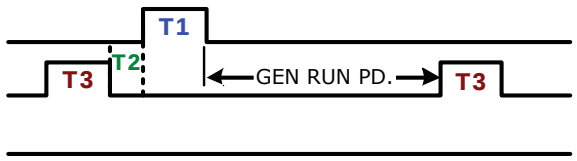
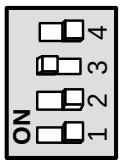
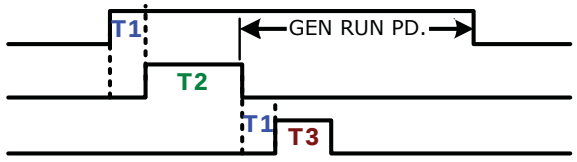
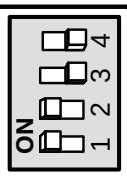
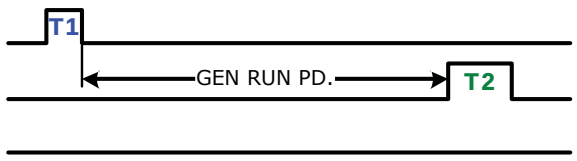
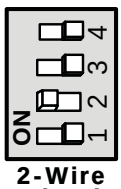
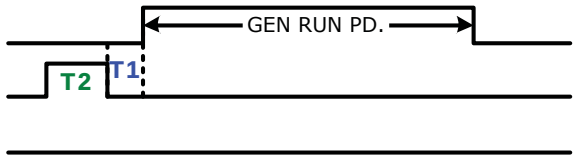
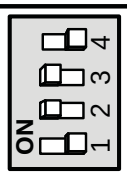
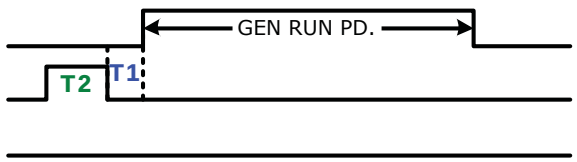
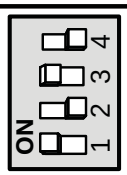
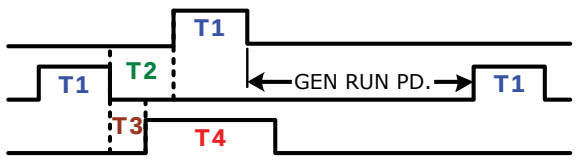
Table 3-1, Gen Type Settings

Gen Type	Relay Timing/Operation (RY1/RY2/RY3)	Time Period
 **QD Mode** *(default)*	 Generator: Quiet Diesel Series (Onan). HDZAA model is not compatible with the AGS-N module – damage may occur.	**T1** = 20 sec. **T2** = 4 sec. **T3** = 10 sec.
 **3-Wire Mode**	 Generators: Marquis, Emerald, and Microquiet (Onan); Quiet Pack Series (Generac).	**T1** = 5 sec. **T2** = 2 sec. **T3** = 10 sec.
 **Portable Mode**	 Generator: EM Series with remote control (Honda).	**T1** = 2 sec. **T2** = 10 sec. **T3** = 5 sec.
 **2-Wire Momentary Mode**	 Generator: PT-ECU-63 controller with 2-wires (Powertech).	**T1** = 2 sec. **T2** = 10 sec.
 **2-Wire Maintain Mode**	 Generators: RMY Series (Kohler); DynaGen controllers.	**T1** = 4 sec. **T2** = 10 sec.
 **2-Wire Standby Mode***	 Generators: Two-wire start (does not require gen run voltage signal to Terminal #2).	**T1** = 4 sec. **T2** = 10 sec.
 **5-Wire Mode**	 Generators: BTDA / BEG (Westerbeke), 205-DS (Martin Diesel), NL-673 (Northern Lights).	**T1** = 10 sec. **T2** = 14 sec. **T3** = 4 sec. **T4** = 25 sec.

* ME-AGS-N Revision 5.2 or higher required

4.0 ME-AGS-N Module Functional Tests

After all electrical connections to the AGS module, batteries, and generator have been completed (and prior to reconnecting the green 8-port terminal block), perform the following tests to verify that the AGS system is functioning correctly and the wiring from the AGS to the generator is correct. Once the AGS module passes the functional tests, you can set up the AGS for your autostart and autostop requirements (refer to: Section 8.0 for a ME-RC controller, Section 9.0 for a ME-ARC, or Section 10.0 if you have a ME-RTR).

Note: The communication cable from the inverter to the green NETWORK port on the AGS is not required in order to perform these tests.

4.1 Power-Up Test

1. Before connecting the 8-port terminal block into the AGS module, use a multimeter to verify the correct polarity and that the voltage to Terminals #3 (positive) and #4 (negative) is correct according to the position of the input DC voltage jumper (refer to Figure 3-2).
2. Apply power to the AGS module by plugging in the green 8-port terminal block into the module, and then verify that the green READY LED comes on and the STATUS LED blinks green once.

Info: The green READY LED will come on (solid) when the AGS module is powered and the temperature sensor is connected, and will blink if the temperature sensor is not connected or detected. A connected temperature sensor is not required unless the temperature autostart feature is needed.

4.2 Generator Wiring Test

This start/stop test is used to confirm that all wiring from the generator to the AGS module is correct and the Gen Type setting (Table 3-1) is configured correctly for your generator type.

1. Press and release the red TEST button on the AGS (see Figure 5-1).
2. The STATUS LED on the AGS module will begin to blink green and the generator should start (a blinking green STATUS LED means the AGS has initiated an automatic generator start/stop sequence).
3. Once the generator starts, it should run for approximately 30-60 seconds before automatically turning off (ensure the it will not try to restart within the next two minutes). View the STATUS LED and ensure it turns solid green (a solid green STATUS LED means the generator has started successfully and is providing the gen run sense signal to the AGS module[1]).

Note: If the generator attempted to start but did not run, continue to wait, the AGS will attempt to start the generator 3 more times.

If your AGS/generator system passes all steps above (may attempt an autostart 4 times), then the wiring from the AGS to the generator is correct. You are now ready to set up and activate the AGS using your remote control panel.

Info: The AGS attempts to start the generator 4 times. If after 4 attempts the generator fails to start, the STATUS LED turns red – indicating a fault.

If the generator did not start, or the STATUS LED shows a fault condition (solid red LED indication), refer to Section 6.0 "ME-AGS-N Module Troubleshooting".

Note[1]: *The gen run sense signal from the generator to Terminal #2 on the AGS is not required when using the 2-Wire Standby Mode (Gen Type setting).*

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5.0 ME-AGS-N Module Operation

This section details the operation of the ME-AGS-N module (independent of the remote control operation).

5.1 ME-AGS-N Module TEST Pushbutton

The front of the module (Figure 5-1) has a red pushbutton to test the AGS system operation. When the red TEST pushbutton is pressed and released, the AGS initiates an automatic generator start/stop sequence. This test attempts to turn the connected generator on and to have it run for at least 30 seconds before turning off. This start/stop test is used to confirm that all wiring from the generator to the AGS is correct and that the AGS is configured correctly for your generator type.

Note: If the generator is running from an autostart condition when the AGS module's TEST button is pressed, the AGS will turn the generator off and initiate an automatic generator start/stop test sequence (running 30-60 seconds) – using 4 autostart attempts if needed.

5.2 ME-AGS-N Module LED Indicators

The front of the module (Figure 5-1) has two LED indicators for viewing system operation.

5.2.1 STATUS LED Indicator

Blinking Green: Indicates that the AGS system is initiating a generator start sequence. This happens when the TEST button (on the AGS) has been pressed and released, or a remote control has communicated to the AGS to autostart the generator.

Solid Green: Indicates the generator has started successfully and is providing the gen run sense signal/voltage to the AGS module.

Solid Red: Indicates a fault condition in which the generator either has not started, or has not provided the correct run gen sense signal/voltage to the AGS module – after four start attempts.

5.2.2 READY LED Indicator

Solid Green: Indicates the AGS module has power and the temperature sensor cable is detected. This indicates normal AGS system operation.

Blinking Green: Indicates that the AGS module has power, but the temperature sensor is not detected. This can mean the temperature sensor cable is either not connected, incorrectly connected, or is defective.

Note: The temperature sensor is not required to be connected unless the temperature autostart feature is needed.

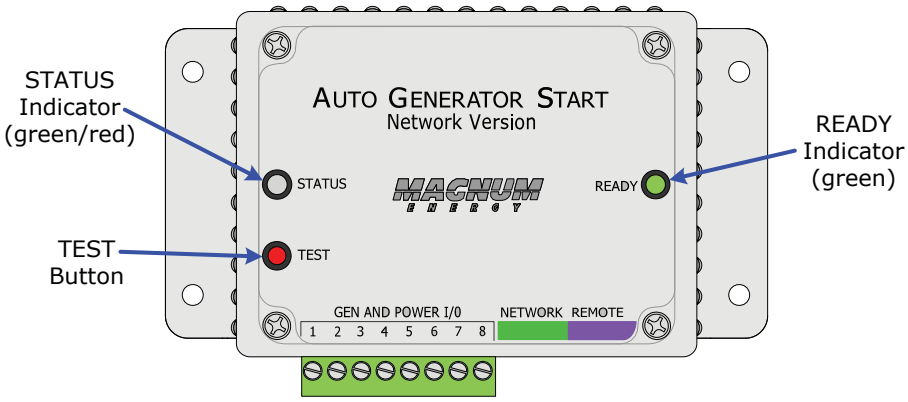

Figure 5-1, ME-AGS-N Front Panel Controls and Indicators

6.0 ME-AGS-N Module Troubleshooting

6.1 Using the ME-AGS-N's LED Indicators

The two LEDs on the front of the AGS controller indicate how the AGS is operating and help you troubleshoot the AGS system. The STATUS LED is bi-color (green or red) and indicates the AGS's status. The READY LED is green, and lights if the AGS has power and the remote temp sensor is connected.

The AGS controller performs a "self test" when power is first applied. The green READY LED lights up (solid) and the STATUS LED blinks green once. If the self-test is successful, test the AGS system for proper operation by pressing and releasing the TEST button. The STATUS LED blinks green, and the AGS should start the generator. Once the generator starts, the STATUS LED lights solid green and the generator runs for approximately 30-60 seconds, and then shuts off (will not try to restart within the next two minutes). If the generator does not start and stop as expected, refer to Table 6-1 below to help find a solution.

WARNING: Completely unplug the green 8-port terminal block from the AGS module before performing maintenance on the electrical or generator system to prevent harm to servicing personnel.

Table 6-1, ME-AGS-N Module Troubleshooting Guide

LED Indication	Symptom	Solution
STATUS is on red = Gen fault	1. Gen won't start; or 2. Gen won't run. It starts, but is stopped by the AGS (B+ or gen run sense voltage not sensed to Terminal #2).	Refer to Section 6.0 "ME-AGS-N Module Troubleshooting" for assistance. Unplug/remove and reconnect the green 8-port friction-fit terminal block to reset the STATUS (fault) indicator.
STATUS is blinking green = Gen start initiated	Gen start initiated.	No problem – normal operation.
STATUS is on solid green = Gen run	Gen is running.	No problem – normal operation.
READY is off = No power connected to the AGS module	DC voltage to Terminals #3 (+) and #4 (-) on module missing or incorrect.	1. Check fuse, check DC wiring. 2. Check the DC voltage under the AGS TECH menu.
READY is blinking = The temperature sensor is not detected ***Note:*** Temp sensor is not required to be connected unless the temp autostart feature is needed.	The temp sensor is not sensed or plugged into the purple REMOTE port.	1. Check the temp sensor cable and its connection to the purple REMOTE port, or 2. Check the temp sensor cable for any damage. 3. Obtain another temp sensor cable. 4. Check the DC voltage under the AGS TECH menu.
READY is on (solid) = Power and temp sensor connected	The temp sensor is connected to the purple REMOTE port.	No problem – normal operation.

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6.2 Generator Starting / Running Troubleshooting

This section helps troubleshoot the generator system when the AGS's STATUS LED shows a fault condition (solid red LED indication), or the remote control displays a generator autostart fault.

Press the *TEST* button on the AGS module, or start the generator from the remote (refer to Section 8.2.1.2 - RC, 9.2.1.2 - ARC, and 10.2.1.3 - RTR).

6.2.1 If the Generator will not Start or Run

If the generator does not start after pressing the AGS module's *TEST* button, follow the steps below.

1. Ensure the green READY indicator on the AGS module is on (blinking or solid) to indicate that the AGS module is getting power (see Figure 5-1).
2. Check the generator for fuel or for any fault codes, or check the generator's operating manual for troubleshooting tips to resolve why the generator will not start or run.
3. Check that the start/stop wiring has not come loose and is correctly connected for your generator model. A wiring diagram for your particular brand and model of generator may be available, check our website at: http://www.magnumenergy.com/service/genwiringdiagrams.htm
4. Your generator may require a higher amperage start signal than what our AGS relays are rated (approx. 5 amps); in that case, you will need to supply a higher-rated external relay.
5. If the generator tries to start as soon as you initiate a test (instead of waiting for the initial stop signal before attempting to start), check the start and stop wire connections, it is possible that they are reversed.
6. Remove the generator start/stop wires from the AGS's 8-port terminal. Simulate the AGS relays by physically connecting the start wires first to ensure the generator starts and runs. Then, connect the stop wires and ensure the generator stops. If the generator does not start or stop as it should, recheck and troubleshoot the start/stop wiring to the generator.

6.2.2 STATUS LED does not go Solid

If the generator is running, but the STATUS LED on the AGS module is not on solid, then:

1. Ensure the AGS is not in warm-up (STATUS LED should go solid once the warm-up period is over).
2. Confirm you are getting the correct gen run sense signal based on your Gen Type setting.

Info: Refer to the Gen Type Setting section (page 19) and Table 3-1 (page 20) to determine your Gen Type setting.

- **Gen Type is 2-Wire Standby Mode** – When using 2-Wire Standby mode, the gen run sense signal is communicated from the remote control to the AGS thru the remote control cable. The AGS determines that the generator is running when the remote communicates that it is in a charge state (i.e., Charging, Bulk Charge, Absorb Charge, etc.).

  Note: In order to perform the 2-Wire Standby mode tests: the remote control must be connected to the inverter, and the green Network port on the inverter must be connected with the communication cable to the green NETWORK port on the AGS.

1. Ensure the remote control is in a charge state (i.e., Charging, Bulk Charge, Absorb Charge, etc.). If not, then:

   a) Ensure the generator's AC output is connected to the Magnum inverter's AC input. Check the wiring and the AC breaker to the inverter's AC input.

   b) Ensure the AC input breaker on the inverter has not popped out/ opened up.
2. Ensure the network communication cable (Section 2.4.2) and the remote cable are the correct type (refer to remote's operating manual).

- **Gen Type is not 2-Wire Standby Mode** – Except for 2-Wire Standby mode, all other Gen Types use DC voltage as the gen run sense signal to the AGS. While the generator is running, use a DC voltmeter to confirm there is 10 to 40 volts DC between Terminals #2 (+) and #4 (-) on the AGS's green 8-port terminal.

  Note: The following tests can be performed without either a remote control connected to the inverter or the network communication cable connected from the inverter to the AGS's green NETWORK port.

  A. Use a DC voltmeter to ensure you have a 10 to 40 volts DC reading between Terminals #2 and #4 while the generator is running. Shut the generator down, and then recheck voltage to confirm it has gone away with the generator being off.

  1. If the voltage is correct and goes away when the gen is off, then the gen run sense signal is correct. Proceed to the remote control section to set up and enable the AGS to autostart your generator.
  2. If the voltage is still present with the generator off, then it is not a correct gen run sense signal. Determine where it is coming from and remove or correct it using the gen run sense signal (voltage) options found in Figure 2-10.

  B. If the DC voltage is incorrect or missing between Terminals #2 & #4:

  1. Check the fuse and wiring to Terminal #2. The wire on Terminal #2 may be loose, you may have a blown fuse, or the other end of the wire may not be connected to a proper run signal like the Gen Hour Meter or one of our alternate gen run sense signal (voltage) options found in Figure 2-10.
  2. Ensure the negative terminal of the monitored battery bank***** is in common/connected with the negative side of the generator battery. This ensures that the positive battery voltage (to Terminal #3) and the positive gen run sense voltage from the generator (to Terminal #2) have a common negative reference (to Terminal #4), and are correctly sensed/measured by the AGS.

** Monitored Battery Bank – When autostarting the generator based on battery voltage (i.e., start VDC), the inverter's battery bank must be connected to Terminals #3 (positive) and #4 (negative). If autostarting based on any other condition (i.e., temperature, amps, etc.), either the inverter battery bank or the generator's battery may be used to power the AGS module. However, if different battery banks (inverter and generator) are used, the negative terminal of each battery bank must be connected together to prevent damage to the AGS (see Section 2.4.4).*

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7.0 Using a Remote with the ME-AGS-N

When an AGS is released with a new software revision, some of the features and functionality in the new AGS may not be available in an inverter or remote control that has an earlier software version. Before continuing to your specific remote control section in this manual, you should evaluate the software compatibility between your inverter, remote control, and AGS to determine what AGS features are available.

7.1 AGS to Inverter Compatibility

Magnum Energy's AGS has many advanced features, and these features work with your Magnum inverter using the settings/setup menus provided in a Magnum remote control (i.e., ME-RC, ME-ARC, and ME-RTR). Depending on the desired AGS feature, you must ensure that the feature is compatible with your inverter and is available in your remote control.

To determine your inverter's compatibility level, go to:

http://www.magnumenergy.com/service/compatibility.htm

After identifying the inverter's compatibility level, use Table 7-1 below to find the AGS feature and determine if the inverter is at a level that is compatible; and, which remote control and revision is required to provide the AGS feature you desire.

Table 7-1, AGS Compatibility Matrix Chart

AGS Feature	Inverter Level Required	Remote Control / Revision Required		
		ME-RC	ME-ARC	ME-RTR
Turn gen on/off with remote	≥ Level 1	NA	≥ 2.0	≥ 2.0
Displays DC voltage to AGS	≥ Level 1	≥ 1.5	≥ 2.0	≥ 2.0
Displays gen run time	≥ Level 1	≥ 1.5	≥ 2.0	≥ 2.0
Displays AGS temperature	≥ Level 1	≥ 1.5	≥ 2.0	≥ 2.0
Displays days since gen last ran	≥ Level 1	≥ 1.5	≥ 2.0	≥ 2.0
Gen starts on temp/stops on time	≥ Level 1	≥ 1.5	≥ 2.0	≥ 2.0
Gen starts on VDC/stops on time	≥ Level 1	≥ 1.5	NA	NA
Gen starts on VDC/stops on VDC or Float charge	≥ Level 1	NA	≥ 2.0	≥ 2.0
Gen starts/stops based on time of day	≥ Level 1	NA	≥ 2.0	≥ 2.0
Gen starts/stops based on inverter AC amps	≥ Level 4 *[Note 1]*	NA	≥ 2.0	≥ 2.0
Gen starts/stops based on battery SOC *[Note 2]*	≥ Level 1	NA	≥ 2.0	≥ 2.0
Set Max Gen Run Time	≥ Level 1	NA	≥ 2.0	≥ 2.0
Set Gen Quiet Time	≥ Level 1	≥ 1.5	≥ 2.0	≥ 2.0
Set Gen Exercise	≥ Level 1	NA	≥ 2.0	≥ 2.0
Set Gen Warm-up Time	≥ Level 1	NA	≥ 2.0	≥ 2.0
Set Gen Cooldown Time	≥ Level 1	NA	≥ 2.0	≥ 2.0

[1] Only applicable to MS-PAE and MS-PE inverters.

[2] The gen start/stop SOC feature requires the ME-BMK (Battery Monitor) to be installed.

7.2 Software Differences Between AGS Revisions

This AGS manual covers a ME-AGS-N revision of ≥5.0. There may be differences between revisions that affect your AGS setup/operation, use Table 7-2 below to be aware of the differences between AGS revisions.

Info: Refer to your specific remote control section in this manual for information on determining your AGS revision.

Table 7-2, AGS Revision Differences

	ME-AGS-N Revision		
Revision Changes	**5.0**	**5.1**	**5.2**
Use 2-Wire Standby mode (Gen Type setting)	NA	NA	YES
Max Gen Run Time setting can be disabled	NO	NO	YES
Gen Run Time is available for display on remote	ME-ARC & ME-RTR only	ME-ARC & ME-RTR only	ME-RC, ME-ARC & ME-RTR

Can I upgrade the software on my ME-AGS-N? Yes, and it's pretty simple and not very expensive. For $50 USD plus shipping, you can send your ME-AGS-N to Magnum Energy and have it upgraded to the latest revision. If this is something you want to do, contact Magnum Energy to provide us with your contact and credit card information (VISA or MasterCard only) and we will provide you with an RMA (Return Material Authorization) number. Once you have this RMA number, you can send the ME-AGS-N to us and we will upgrade it to the latest revision available and ship it back to you.

Note: The ME-AGS-N is not the same device as the ME-AGS or ME-AGS-S. If you have one of these devices, you can contact Magnum Energy to determine if you have any upgrade options.

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8.0 Using the ME-RC Remote

The ME-RC remote's AGS menus under the AGS and TECH buttons allow you to customize and monitor the operating parameters for your autostart/autostop generator system. To help configure and operate the AGS with your ME-RC, refer to the mini index below to direct you to the appropriate section.

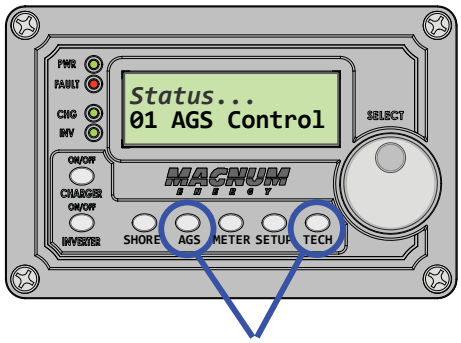

Figure 8-1, ME-RC's AGS Configuration Access Buttons

This AGS manual covers ME-RC remote controls with a revision of 1.5 to 2.612. There may be differences between revisions that affect your AGS setup/operation. Use Table 8-2 to familiarize yourself with the differences between AGS revisions.

Info: Refer to your ME-RC owner's manual to determine your remote's revision (or see the *AGS: 08 AGS TECH* menu section on page 35).

8.1 ME-AGS-N Setup using the ME-RC

Press the AGS button on ME-RC remote (Figure 8-1), and then rotate the SELECT knob to navigate to the AGS menus. These menus allow the generator to be automatically started and stopped based on different parameters. Using Table 8-1, determine the specific autostart and autostop condition with which you want the generator to be automatically controlled, and then use that specific menu setting to configure the AGS.

Note: For information on using the *AGS: 01 AGS Control, AGS: 02 AGS Status,* and *AGS: 08 AGS TECH* menus, refer to Section 8.3 "ME-AGS-N Operation/Monitoring using the ME-RC".

Table 8-1, ME-RC Autostart / Autostop Matrix

Autostart Condition	See AGS Menu	Page	Autostop Condition	See AGS Menu	Page
Gen starts on high temperature	04 Start Temp F	30	Gen stops after a set time period	03 Run Time Hour	30
Gen starts on low inverter battery voltage	05 Start Volts	32			

Table 8-2, Software Differences Between ME-RC Revisions

AGS Menu (Button: Menu)	AGS Menu Selections / Adjustments	Inverter Level	ME-AGS-N Required	ME-RC Required
AGS: 01 AGS Control	Off, Enable, Test, Enable w/QT	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
AGS: 02 AGS Status	Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
AGS: 03 Run Time Hour	0.5 - 6.0 Hours	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
	0.5 - 25.5 Hours	≥ Level 1	≥ Rev 5.0	≥ Rev 2.6
AGS: 04 Start Temp F	Off, 65 - 90F	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
	Off, Ext Input, 65 - 90F	≥ Level 1	≥ Rev 5.0	≥ Rev 2.1
	Off, Ext Input, 65 - 95F	≥ Level 1	≥ Rev 5.0	≥ Rev 2.5
AGS: 05 Start Volts	Off, 10.0-12.2, 20.0-24.4, VDC	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
	Off, 10.0-12.2, 20.0-24.4, 40.0-44.8 VDC	≥ Level 1	≥ Rev 5.0	≥ Rev 1.6
AGS: 06 Set Time	12:00A-12:00P	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
AGS: 07 Quiet Time	Off, 9PM-7AM, 9PM-8AM, 9PM-9AM, 10PM-8AM, 11PM-8AM	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
AGS: 08 AGS TECH				
Gen Run	Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5*
AGS VDC	Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
AGS Rev	Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
Temp	Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
AGS Mode	RV, Other	≥ Level 1	≥ Rev 5.0	≥ Rev 2.5
TECH: 01 Temperatures	AGS: Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
TECH: 02 Revisions	AGS: Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
Active AGS Fault	Fault LED = off, Fault status = view under AGS: 02 AGS Status	≥ Level 1	≥ Rev 5.0	≥ Rev 1.5
	Fault LED = blinking, Fault status = alternates with inverter/charger status	≥ Level 1	≥ Rev 5.0	≥ Rev 2.612

***** *Requires ME-AGS-N Rev. 5.2 or higher*

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AGS: 03 Run Time Hour Menu

This menu provides the settings that determine the length of time the generator will run once it has been autostarted by the AGS.

Default setting: *Run Time = 2.0 Hrs*

Range: *0.5 Hrs - 25.5 Hrs (0.5 hr increments)*

How long should I set the generator run time? This depends on whether you are using the high temperature or low battery voltage autostart feature.

- **Using high temperature to autostart:** When using the high temperature autostart feature, the generator autostarts and runs until the *AGS: 04 Start Temp F* setting is reached. This means you could set the time to the lowest time setting (*0.5 Hrs*), knowing the generator will run until the temperature setting is satisfied.
- **Using low battery voltage to autostart:** When using the low battery voltage autostart feature, the generator run time is normally set to help re-charge the batteries. Use the table below to help determine the generator run time setting based on the 20-hour AH capacity of your inverter's battery bank.

Table 8-3, Battery AmpHrs Capacity to Suggested Gen Run Time

Battery AmpHrs Capacity	Suggested Gen Run Time	Battery AmpHrs Capacity	Suggested Gen Run Time
200 to 300	1 hour	1310 to 1500	4 hours
310 to 500	1.5 hours	1510 to 1700	4.5 hours
510 to 700	2 hours	1710 to 1900	5 hours
710 to 900	2.5 hours	1910 to 2100	5.5 hours
910 to 1100	3 hours	2110 to 2300	6 hours
1110 to 1300	3.5 hours	2310 to 2500	6.5 hours

AGS: 04 Start Temp F Menu

This menu allows you to set and enable a temperature value that will cause the generator to automatically start — to power an air conditioner (A/C) unit for cooling — based on an increase in temperature, or by using an air conditioning thermostat control.

Info: The optional ME-PT1 or ME-PT2 pigtail adapters can be used to connect an air conditioner control circuit or a relay control circuit. For more information, refer to the instruction sheet for each pigtail adapter; either part number 64-0025 (ME-PT1 Instruction Sheet), or 64-0026 (ME-PT2 Instruction Sheet).

This temperature autostart feature requires that the AGS's remote temperature sensor cable (as shown in Figure 1-2) or an optional ME-PT1 or ME-PT2 pigtail adapter be connected to the REMOTE port on the AGS (see Figure 2-3). The location of the remote temperature sensor determines the area being monitored for temperature. When the temperature around the remote temperature sensor (based on the *AGS: 08 AGS TECH* menu's *Temp* display) increases to the *AGS: 04 Start Temp F* setting, the generator automatically starts and runs based on the *AGS: 03 Run Time Hour* setting. When this run time period is finished, the temperature sensor reading is checked. If the

temperature sensor (or thermostat control – if using the optional pigtail adapter) reading is below the *AGS: 04 Start Temp F* setting, the generator will autostop. If the temperature sensor (or thermostat control) reading is above the *AGS: 04 Start Temp F* setting, the generator will continue to run for a second run time period. At the end of this second run time period, the temperature sensor reading (or thermostat control) is checked again. This cycle continues as long as the *AGS: 01 AGS Control* menu is set to *Enable* (or *Enable w/QT*).

If the temperature autostart feature is not needed, ensure this setting is set to the *Off* position.

- **65F - 95F** – These settings determine the rising temperature value that will trigger a generator autostart.
- **Ext Input** – This setting is used when an optional AGS adapter (PT1 or PT2) is used. When an AGS adapter is connected to the AGS's REMOTE port, an external command from a thermostat connection on an A/C control unit causes the generator to start. See the ME-PT1 or ME-PT2 instruction sheets for more information on pigtail adapters.

  Default setting: *Start Temp = Off*

  Range: *Off, Ext Input, 65F - 95F (5 deg. increments)*

Why should I use Start Temp? Typically, in a mobile application (RV or boat) where the A/C unit is too much power for the inverter to run from the batteries, this feature is used to start the generator to run an air conditioning unit. Many RV and marine customers travel with pets and do not want them to be at risk from dangerous inside temperatures if they are away from the coach/boat. With this feature, you can set the A/C to turn on and then leave. Whenever the inside temperature rises to the start setting, the generator automatically starts to provide power to the A/C unit. This keeps the area cool and comfortable – plus, while the generator is on, the inverter batteries are being charged.

Where should I set Start Temp? If you are using this feature to power an air conditioning unit, the *AGS: 04 Start Temp F* setting should be slightly above the A/C unit's thermostat "cool" temperature (usually around 70-72F). Once the temperature setting is reached, the generator will start providing power to the A/C unit. The reason the temperature is set above the A/C unit's thermostat is to ensure the A/C unit will run when the generator starts. If the AGS's temperature setting is below that of the air conditioning unit's thermostat setting, the generator will run, but the A/C unit is not calling for a run period or cooling; your generator is running, but the power is not being used by the A/C unit – resulting in wasted fuel and run time.

Info: If using the temperature autostart feature to start a generator that is powering two A/C units, it is suggested that the second A/C unit's thermostat be set 2° to 5° higher than the first A/C unit. This staggered setting will allow the first A/C unit to start and run in an effort to keep the coach cool. If the temperature continues to rise inside the coach, the second A/C unit will turn on to further cool the coach.

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AGS: 05 Start Volts Menu

This menu allows you to set and enable a battery voltage value that causes the generator to automatically start. Starting the generator on voltage is the most common method of autostarting the generator – it is considered the simplest and easiest to understand. When the battery voltage (on Terminals #3 & #4) decreases to or below this setting for two continuous minutes, the generator will automatically start and run based on the AGS: *03 Run Time Hour* setting. If the DC voltage start feature is not needed, ensure this setting is set to the *Off* position.

Default setting: *Start VDC = 11.0 VDC (12v), 22.0 VDC (24v), 44.0 VDC (48v)*

Range: *Off, 10.0-12.2 VDC (12v), 20.0-24.4 VDC (24v), 40.0-48.8 VDC (48v)*

Info: The default settings and range are automatically determined based on the connected inverter and the measured VDC.

Where should I set Start Volts? When setting the VDC start voltage, it must be high enough to not over-discharge the battery, but also low enough to keep from nuisance starting the generator. Typically, start volts is set based on what is determined to be approximately 50% of the battery capacity. Since this is an inverter/battery system, and the battery is normally loaded, the VDC used to determine 50% battery capacity should be set lower than what is shown on typical battery voltage SOC charts (approximately 11-11.5 in a 12-volt system), which show the battery at rest (not loaded).

Info: The DC voltage the AGS uses to determine when to autostart is displayed in the *AGS: 08 AGS TECH* menu under the *AGS VDC* meter.

AGS: 06 Set Time Menu

This menu is used to set the ME-RC remote's internal clock. The ME-RC contains a real time clock that must be set for proper operation of the AGS button's *07 Quiet Time* feature. If the Quiet Time feature is not used, the time does not need to be set.

Info: The clock obtains power from the inverter and resets if the ME-RC is disconnected from the inverter, or the inverter is powered down.

To set the current time:
(From the *06 Set Time* menu)

- **Hour** – Rotate the SELECT knob to the correct hour of day, and then press SELECT.
- **Minute** – Rotate the SELECT knob to the correct minute setting, and then press SELECT.
- **AM-PM** – Rotate the SELECT knob to the appropriate AM or PM setting, and then press SELECT.

AGS: 07 Quiet Time Menu

This setting is used to prevent the generator from autostarting during a specific designated time period each day.

Info: If the generator is running when the Quiet Time start time setting is reached, it automatically stops and does not allow the gen to autostart until after the Quiet Time stop time setting has passed.

To enable, access the *Quiet Time* menu and select a time period.

Default setting: *Quiet = Off*

Range: *Off, 9PM-7AM, 9PM-8AM, 9PM-9AM, 10PM-8AM, 11PM-8AM*

Why should I use Quiet Time? Quiet Time is used when there are park rules or local noise regulations that prevent generators from running during a certain time. It is usually set in consideration of when people may be sleeping. If there are no local rules or regulations, you may not want to use Quiet Time – which would allow the generator to run at any time in a 24-hour period.

Where should I set Quiet Time? Select the time period that coincides with any local noise requirements, or any time period that you do not want the generator to automatically run.

8.2 ME-AGS-N Functional Tests using the ME-RC

Once you establish all the autostart/autostop settings you need, perform the following tests to verify that the AGS system is functioning correctly and the communication from the remote/inverter to the ME-AGS-N is correct.

8.2.1 Remote to Generator Communication Test

This section describes how to determine the current AGS status and how to use the ME-RC remote to start the generator.

8.2.1.1 Determining AGS Status

Use your remote control to determine the AGS's status by pressing the AGS button, rotating the SELECT knob to the *02 AGS Status* menu, and then pressing the SELECT knob.

The AGS's status should be *Off* or *Ready*. If it displays either status, then the remote/inverter is correctly communicating with the AGS. If the AGS status displayed is not *Off* or *Ready*, then refer to Section 12.2 "Resolving Operational Statuses" or Section 12.3 "ME-AGS-N Faults using your Remote" for assistance before continuing.

8.2.1.2 Starting the Generator from the Remote

To confirm that the generator will turn on and run from the remote:

1. Press the AGS button, the bottom line of the remote should display the *01 AGS Control* menu.
2. Press the SELECT knob and rotate it to *AGS = Test*.
3. Press the SELECT knob to activate the generator test.

Once the generator starts, it should run for approximately 30-60 seconds before automatically turning off. View the AGS module's STATUS LED and ensure it turns solid green (solid green STATUS LED means the generator has started successfully and is providing the gen run sense signal to the AGS module).

Note: If the generator attempted to start but did not run, continue to wait, the AGS will attempt to start the generator 3 more times.

If your AGS/generator system passes all three steps (may attempt an autostart 4 times), then the wiring from the AGS to the generator is correct. You are now ready to activate the AGS using your remote control panel.

Info: The AGS attempts to start the generator 4 times. If after 4 attempts the generator fails to start, the STATUS LED turns red – indicating a fault.

If the remote control displays an AGS fault (under *02 AGS Status*) or the AGS module's STATUS LED shows a fault condition (solid red LED indication), refer to Section 12.3 for assistance.

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8.3 ME-AGS-N Operation / Monitoring using the ME-RC

This section covers the AGS menus in the ME-RC remote that determine how to control and operate the generator. The section also includes menus that are used to monitor starting and running conditions for the AGS and the generator.

8.3.1 Controlling the AGS using the ME-RC

Press the AGS button, and then rotate and press the SELECT knob to access the following menus:

AGS: 01 AGS Control Menu

This menu is used to enable the AGS (selecting *Enable* or *Enable w/QT*). A "*Test*" setting is also available to ensure the start/stop wiring from the generator to the ME-AGS-N is correct. The available settings are:

- **Off** – This option disables the AGS's generator start/stop functions. It also turns the generator off if it is running from an autostart command. When *Off* is selected, the generator will not start automatically. This is the default setting. If you have an AGS fault, select *Off* to clear the fault.

Info: If DC power is lost to the remote or to the system, this menu resets to the default *Off* position for safety.

- **Enable** – Select this option to have the AGS monitor temperature (*04 Start Temp F*) and/or the inverter's battery voltage (*05 Start Volts*) to determine when to automatically start the generator.
- **Test** – Select this option to test the generator. This option starts the generator, runs it for approximately 30-60 seconds, and then stops the generator. Use this setting for testing generator wiring and operation. After a successful start/stop sequence test, this selection returns to *Off*.
- **Enable w/QT** – Select this option to have the AGS monitor temperature (*04 Start Temp F*) and/or the inverter's battery voltage (*05 Start Volts*) to determine when to automatically start the generator – with the Quiet Time parameters enabled.

WARNING: Never allow the generator to start/run in an enclosed garage or any other type of enclosed structure without proper ventilation. Carbon monoxide, an odorless, colorless, deadly gas may accumulate and cause serious injury or death.

8.3.2 Monitoring the AGS using the ME-RC

The following menus are helpful for the proper operation and monitoring of your AGS/generator system. Press the AGS button, and then rotate and press the SELECT knob to access the following menus:

AGS: 02 AGS Status Menu

This menu allows you to view the AGS's current status. There are 13 different status messages to identify the AGS's current state, but only one is displayed at any one time (refer to the AGS menu map – Figure 8-2).

Available statuses are (refer to Tables 11-1 thru 11-3 for detailed descriptions of each):

- AC In
- Manual Run
- No Comm
- Off
- Quiet Time
- Ready
- Start Temp
- Start Test
- Start VDC
- Fault Temp
- Fault Test
- Fault VDC
- Lockout

Info: This menu is important when determining if the AGS is working correctly, or for troubleshooting an AGS installation.

Info: For any fault mode displayed in the status menu, please refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.

Note: AGS menus *03-07* were covered in Section 8.1.

AGS: 08 AGS TECH Menu

This menu displays meter data on the operating condition of the generator and AGS, and has an AGS mode setting.

- **Gen Run** – Displays the number of hours the generator has been currently running from an autostart condition. This menu does not determine run time when the generator has been manually started.
- **AGS VDC** – Displays the battery voltage currently connected to the AGS (on Terminals #3 and #4). This voltage is used to power the AGS and is the voltage reading the *05 Start Volts* setting is monitoring to determine when to start.
- **Temp** – Displays the current temperature reading of the temperature sensor and is the temperature the *04 Start Temp F* setting is monitoring to determine when to start. If the temperature sensor is not installed, the display will either show a very high temperature value (122C/252F), or "*TS open*" displays – depending on your remote revision.
- **AGS Rev** – Displays the software revision of the connected AGS.

  Info: The AGS accessory may display a "*0.0*" revision for several reasons. Either the AGS is not installed, there is no communication because of a bad or miswired network cable, the AGS is not powered, or the AGS is bad.
- **AGS Mode** – This setting allows you to configure the AGS to comply with RVIA standards[1]. When the AGS is set to "*RV*", the AGS is automatically disabled any time the generator is manually turned on or off. Select *Other* if your system is for a RV, or your requirements do not need the AGS to be disabled should the generator be manually started/stopped.

  Default setting: *AGS Mode = RV*

  Settings: *RV, Other*

  Info: When the *RV* mode is used and the AGS system feature is required, the user will need to re-enable the AGS system each time the generator is manually turned on or off.

  Info: If the AGS is automatically disabled when using *RV* mode, the AGS status displays "*Lockout*".

Note[1] *- RV manufacturers use the NFPA 1192 Standard on Recreational Vehicles for installing an AGS system. This standard has a requirement that states when the generator is manually turned on or off, the AGS system must also be turned off. Selecting the "RV" setting satisfies this requirement by automatically disabling the AGS system when it senses that the generator has been manually turned on or off. In installations where the requirement to automatically disable the AGS system is not needed, the "Other" setting can be chosen. When the AGS is in the "Other" mode, manually turning the generator off or on will not automatically disable the AGS system.*

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Press the TECH button, and then rotate and press the SELECT knob to access the following menus:

TECH: 01 Temperatures

This read-only menu displays the ambient temperature reading of the AGS's temperature sensor (if installed). If the temperature sensor is not installed, the display will either show a very high temperature value (122°C/252°F), or "*TS open*" displays – depending on your remote revision.

TECH: 02 Revisions

This read-only menu displays the firmware revision level of the AGS module that is installed and networked.

8.4. Enabling the ME-AGS-N using the ME-RC

Before the AGS can begin operating/monitoring for an autostart condition (using the active AGS settings in your ME-RC remote control), it must be enabled.

To enable the AGS:

1. Press the AGS button. The *01 AGS Control* menu displays.
2. Press the SELECT knob. The current gen control setting displays with an arrow to the right.
3. Turn the SELECT knob to the *AGS = Enable* setting (or to *Enable w/QT*).
4. Press the SELECT knob again to select this setting. The selection arrow appears to the right of the screen.

The AGS is now ready to automatically start/stop the generator once an autostart condition is satisfied.

Note: If power is lost to your remote, the AGS control setting will return to the default *Off* setting. Once power is restored, you must enable the AGS again.

Note: Despite enabling the AGS, you must check the AGS's current status and ensure the status displays as "*Ready*".

8.5 Starting and Stopping the Generator using the ME-RC

The generator can be manually stopped, as well as autostarted/autostopped using the available settings from your ME-RC (see Section 8.1).

To autostart / autostop the generator:

In order for the generator to autostart/autostop, one or more of the following autostart/autostop conditions must be pre-set (see Section 9.1):

Autostart Conditions	Autostop Conditions
• 04 Start Temp F (pages 30-31)	• 03 Run Time Hour (page 30)
• 05 Start Volts (page 32)	• 07 Quiet Time (pages 32-33)
• 07 Quiet Time (pages 32-33)	

To manually stop the generator (only if autostarted by AGS):

1. Press the AGS button. The *01 AGS Control* menu displays.
2. Press the SELECT knob. The current gen control setting displays with an arrow to the right.
3. Turn the SELECT knob to the *AGS = Off* setting.
4. Press the SELECT knob again to select this setting. The selection arrow appears to the right of the screen and the display returns to the *01 AGS Control* menu. The generator should stop at this time.

If the generator does not stop as expected, refer to Section 12.0.

8.6 ME-AGS-N Menu Map using the ME-RC

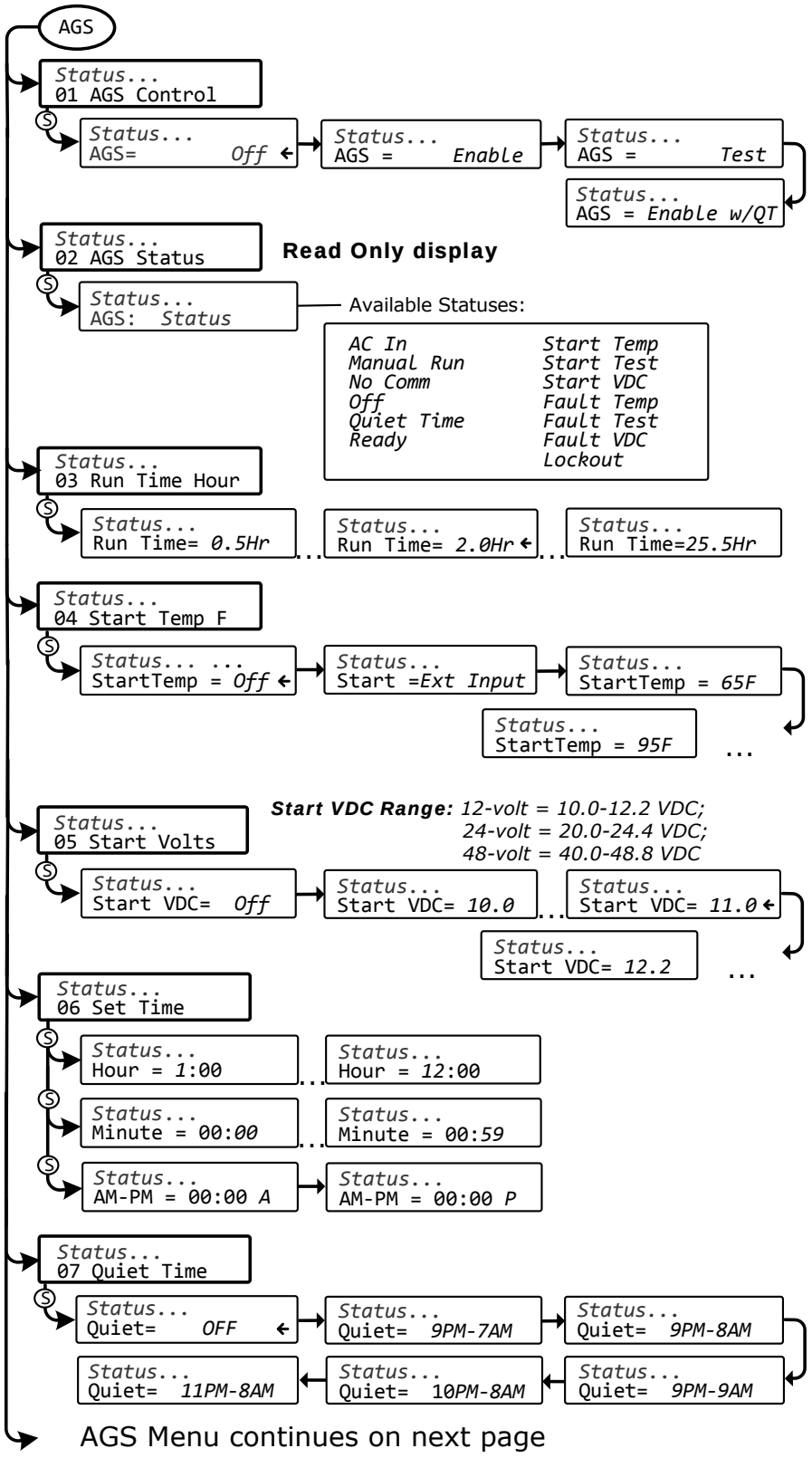

Figure 8-2, AGS Menu Maps in ME-RC Remote (Section 1)

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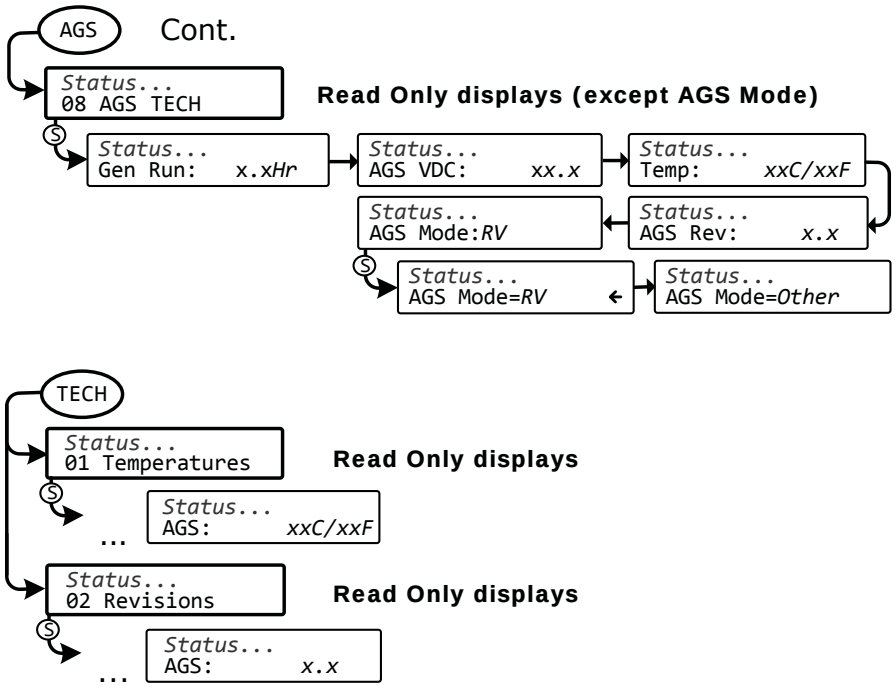

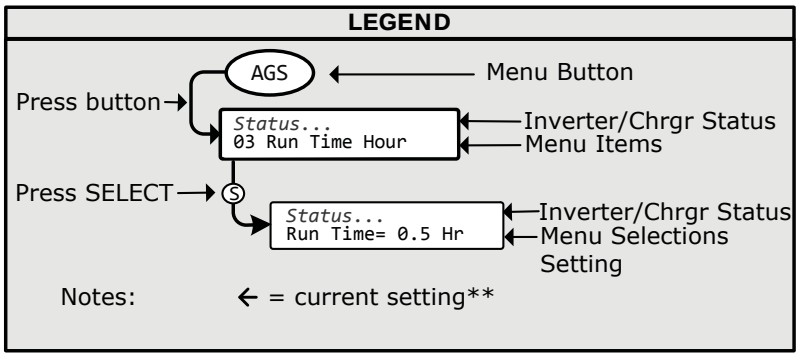

** For this menu map, the arrow denotes the factory default settings

Figure 8-3, AGS Menu Maps in ME-RC Remote (Section 2)

9.0 Using the ME-ARC Remote

The ME-ARC remote control's AGS menus under the CTRL, METER, SETUP, and TECH buttons allow you to customize and monitor operating parameters, and to help troubleshoot your autostart/autostop generator system. To help configure and use the AGS with the ME-ARC, refer to the mini index below to direct you to the appropriate section.

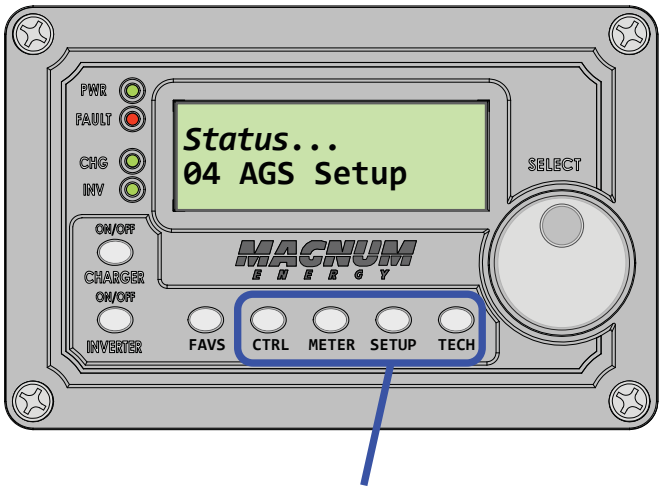

Figure 9-1, ME-ARC's AGS Configuration Access Buttons

This AGS manual covers ME-ARC remote controls with a revision of 2.0 to 2.4. There may be differences between revisions that affect your AGS setup/operation. Use Table 9-2 to familiarize yourself with the differences between AGS revisions.

Info: Refer to your ME-ARC owner's manual to determine your remote's revision (or see the *TECH: 02 Revisions – AGS* menu section on page 56).

9.1 ME-AGS-N Setup using the ME-ARC

Press the SETUP button on the ME-ARC remote, and then rotate the SELECT knob to the *04 AGS Setup* display. The menus available from this screen allow the generator to be automatically started and stopped based on many different conditions. From Table 9-1, determine the specific autostart and autostop conditions with which you want the generator to be automatically controlled, and then use that specific menu setting to configure the AGS.

Info: For information on using the CTRL, METER, and TECH button menus, refer to Section 9.3 "ME-AGS-N Operation/Monitoring using the ME-ARC".

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Table 9-1, ME-ARC Autostart / Autostop Matrix

Autostart Condition	Autostop Condition	See SETUP Menu	Page
Starts on low battery voltage (DC voltage connected to Terminals #3 and #4)	Stops on higher battery voltage	04A Gen Run VDC	42
	Stops at Float charge after a set time period (using Absorb Done Time setting)	04A Gen Run VDC (Set Stop Gen Volts = Float)	42
	Stops at Float charge after battery current requirement is low (using Absorb Done Amps)	04A Gen Run VDC (Set Stop Gen Volts = Float)	42
	Stops at Float charge using a battery SOC setting (using Absorb Done SOC setting)[2]	04A Gen Run VDC (Set Stop Gen Volts = Float)	42
Starts at a set time daily	Stops at a different set time daily	04B Gen Run Time	44
Starts on high AC amps to an inverter load[1]	Stops on lower AC amps to an inverter load[1]	04C Gen Run Amps	44
Starts when the battery SOC[2] is low	Stops when the battery SOC[2] is higher	04D Gen Run SOC	45
Starts when temperature increases	Stops after a set time period	04E Gen Run Temp	46

Note[1]: *Only applicable to MS-PAE and MS-PE inverters.*
Note[2]: *Autostart/stop conditions using SOC require the ME-BMK (Battery Monitor).*

Table 9-2, Software Differences Between ME-ARC Revisions

AGS Menu (Button: Menu)	AGS Menu Selections / Adjustments	Inverter Level	ME-AGS-N Required	ME-ARC Required
CTRL: 03 Gen Control	OFF, ON, AUTO, Test	≥ Level 1	≥ Rev 5.0	Rev 2.0
	OFF, ON, AUTO	≥ Level 1	≥ Rev 5.0	≥ Rev 2.1
METER: 03 AGS Meters				
03A AGS Status (Read Only)		≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
03B DC Volts - AGS (Read Only)		≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
03C Gen Run Time (Read Only)		≥ Level 1	≥ Rev 5.2	≥ Rev 2.0
03D AGS Temp (Read Only)		≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
03E Since Gen Run (Read Only)		≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
SETUP: 04 AGS Setup				
04A Gen Run VDC	Start = OFF, 9.0-16.0 (12V), 18.0-32.0 (24V), 36.0-64.0 (48V) VDC	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
	Stop = OFF, 9.0-16.0 (12V), 18.0-32.0 (24V), 36.0-64.0 (48V) VDC, Float			
	Start/Stop Delay = 0-127 sec., 1-127 min.			

Table 9-2, Software Differences Between ME-ARC Revisions (Cont.)

AGS Menu (Button: Menu)	AGS Menu Selections / Adjustments	Inverter Level	ME-AGS-N Required	ME-ARC Required
SETUP: 04 AGS Setup (Cont.)				
04B Gen Run Time	OFF, ON, Start/Stop = 12AM-12PM	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
04C Gen Run Amps*	OFF, Start/Stop = 5-60 amps AC	≥ Level 4	≥ Rev 5.0	≥ Rev 2.0
	Start/Stop Delay = 0-127 sec., 1-127 min.			
04D Gen Run SOC**	OFF, Start = 20-90%	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
	Stop = 21-100%			
04E Gen Run Temp	Start = OFF, Ext Input, 65-95F	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
	Gen Run Temp Time = 0.5-6.0 Hours			
	Gen Run Temp Time = 0.5-25.5 Hours	≥ Level 1	≥ Rev 5.0	≥ Rev 2.4
04F Max Gen Run Time	0.0-25.5 Hours	≥ Level 1	Rev 5.0 & 5.1	≥ Rev 2.0
	OFF-25.5 Hours	≥ Level 1	≥ Rev 5.2	≥ Rev 2.3
04G Quiet Time	OFF, ON, Start = 12AM-12PM	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
	Stop = 12AM-12PM			
	Quiet Time Topoff = OFF, 30, 60, 90, 120 min.			
04H Gen Exercise	OFF, Days = 1-255	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
	Run Hour = 12AM-12PM			
	Run Time = 0.0-25.5 Hrs			
04I Gen Warm-up Time	0-127 sec., 1-127 min.	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
04J Gen Cooldown Time	0-127 sec., 1-127 min.	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
TECH:				
01 Temperatures	AGS: Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
02 Revisions	AGS: Read Only	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
Active AGS Fault	Fault LED = off, Fault status = view using METER: 03A AGS Status menu	≥ Level 1	≥ Rev 5.0	≥ Rev 2.0
	Fault LED = blinking, Fault status = alternates with inverter/charger status	≥ Level 1	≥ Rev 5.0	≥ Rev 2.3

** Only works with MS-PAE or MS-PE inverters.*

*** The Gen Start/Stop SOC feature requires the ME-BMK (Battery Monitor).*

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SETUP: 04A Gen Run VDC Menu

This menu starts/stops the generator based on the battery voltage as shown on the METER button's *03B DC Volts-AGS* menu. This menu provides the option to start the generator when the battery voltage gets low, and to stop the generator once the battery reaches a higher voltage level, or has been fully charged and goes into the Float Charge stage. Using voltage to automatically start and stop the generator is a common method because it is considered the simplest and easiest to understand. The *04A Gen Run VDC* menu also has a delay setting to minimize nuisance starts/stops and the short cycle run times of the generator.

- **Set Start Gen Volts** – This setting will start the generator when the battery voltage (on Terminals #3 & #4) decreases to or below this setting continuously for the duration of the *Set Start Volts Delay* setting.

  Default setting: *Set Start Gen Volts = 11.5 VDC (12v), 23.0 VDC (24v), 46.0 VDC (48v)*

  Range: *OFF, 9.0-16.0 VDC (12v), 18.0-32.0 VDC (24v), 36.0-64.0 VDC (48v)*

Where should I set Start Volts? When setting the VDC start voltage, it must be high enough to not over-discharge the battery, but also low enough to keep from nuisance starting the generator. Typically, start volts is set based on what is determined to be approximately 50% of the battery capacity. Since this is an inverter/battery system, and the battery is normally loaded, the VDC used to determine 50% battery capacity should be set lower than what is shown on typical battery voltage SOC charts (approximately 11-11.5 in a 12-volt system), which show the battery at rest (not loaded).

Info: The DC voltage the AGS uses to determine when to autostart is displayed in the *AGS: 08 AGS TECH* menu under the *AGS VDC* meter.

Example: Using a 12-volt battery as an example, a typical SOC (State of Charge) battery chart will show that 12.2 VDC is considered 50% SOC. This voltage is a battery "at rest," meaning it has no load connected and has been at rest for a minimum of 30 min. While this voltage is accurate under these at rest conditions, this same voltage with a load applied means the battery is well above 50% SOC, and should be set much lower. The larger the battery bank the less the voltage will be affected by a load applied to the battery bank. A typical start voltage setting would be between 11.0 VDC - 11.5 VDC for a 12-volt system.

- **Set Start Volts Delay** – This setting determines how long the *Start Gen Volts* parameter must be continuously maintained before the generator autostarts. This ensures the generator does not nuisance start. By setting a delay, momentary surge loads will not start the generator when the battery voltage dips due to the heavy load applied to the battery.

  Default setting: *Set Start Volts Delay = 120 Seconds*

  Range: *0 - 127 Seconds, 1 - 127 Minutes*

Where should I set Start Volts Delay? Determine what loads will be running when the generator needs to start. The larger the load the shorter the delay time setting. When a large load is applied to the battery bank the battery voltage drops quickly, so the delay time should be short to ensure the batteries are not over-discharged. If you are unsure what loads might be running or where to set the start delay, error on setting a shorter time such as the default of 2 minutes (to protect batteries from over-discharge).

- **Set Stop Gen Volts** – This setting will stop the generator when the battery voltage (on Terminals #3 & #4) increases to or above this setting continuously for the duration of the *Set Stop Volts Delay* setting. To allow the battery bank to go through a full bulk and absorption charge, this setting should be set to *Float*.

  Default setting: *Set Stop Gen Volts = 14.4 VDC (12v), 28.8 VDC (24v), 57.6 VDC (48v)*

  Range: *OFF, 9.1-16.0 VDC (12v), 18.2-32.0 VDC (24v), 36.4-64.0 VDC (48v), Float*

Where should I set Stop Gen Volts? Typically, when using a generator to charge batteries, most individuals only charge the batteries to 80-85% to compromise between minimizing fuel usage and maximizing battery life. This is done by having the generator start on low battery voltage, and then stop at a higher voltage (i.e., the *Stop Gen Volts* setting). When deciding where to set the *Stop Gen Volts* setting, it must be lower than the inverter's *Absorb Voltage* setting (determined by the *SETUP: 03B Battery Type* menu). Otherwise, the charger will enter Absorption Charge mode — which is required to maintain the batteries at a constant voltage level — and the battery voltage will not reach the *Stop Gen Volts* setting, which will cause the generator to run until it is out of fuel or until it reaches the *SETUP: 04F Max Gen Run Time* setting.

Therefore, after reading this some will think that they should just set the *Stop Gen Volts* setting slightly lower than the absorption level to ensure the charger always reaches the *Stop Gen Volts* setting before it goes into the Absorption Charge mode. However, temperature changes can affect the absorb voltage setting[1] and may require you to readjust the *Stop Gen Volts* setting seasonally. If you are in a normally cold climate (<32°F), the actual absorb charge voltage will increase. So, the *Stop Gen Volts* setting should be set well above the absorb voltage setting (~.5V above for 12-volt systems). If you are normally in a hot climate (>95°F), the actual absorb charge voltage will decrease. In that case, the *Stop Gen Volts* setting should be set well below the absorb voltage setting (~.5V below for 12-volt systems).

A simpler way to charge the batteries to 80-85% and to automatically allow a temperature-compensated charge to the batteries (no seasonal adjustment required) is accomplished using the settings below:

- Set the *Stop Gen Volts* setting to *Float*
- Set the *Absorb Voltage* setting (*SETUP: 03B Battery Type*) to the voltage level at which you want the generator to turn off (normally *~ 14.5 volts* for flooded batteries in a 12-volt system)
- Set the *Absorb Done Time* setting (*SETUP: 03E Absorb Done Time*) to *0.1 hours* (lowest setting)

Using these settings, when the batteries reach a low voltage level the generator turns on (per the *Set Start Gen Volts* setting) and charges the battery to the temperature-compensated *Absorb Voltage* setting. After reaching the absorption voltage level, the inverter/charger goes into Absorption Charge mode and is there for only 6 minutes (0.1 hours) before it goes to Float Charge mode. Once the inverter/charger enters Float Charge mode, the AGS will autostop the generator.

Note[1]: *When the inverter's Battery Temperature Sensor (BTS) is connected, the actual absorb charge voltage will increase or decrease to ensure correct charging as the battery temperature changes.*

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Info: Battery life will be reduced if the batteries are only charged to 80-85% regularly. It is highly recommended to charge the batteries to 100% as often as possible (~ once a week, or every other discharge cycle) in order to avoid sulfation of the battery plates. Using the *SETUP: 03E Absorb Done Time* menu, the absorption charge time can easily be changed to a longer duration to increase the batteries' state of charge.

- **Set Stop Volts Delay** – This setting determines the amount of time the generator will run after the *Stop Gen Volts* setting has been satisfied.

  Default setting: *Set Stop Volts Delay = 120 Seconds*

  Range: *0 - 127 Seconds, 1 - 127 Minutes*

SETUP: 04B Gen Run Time Menu

This menu starts and stops the generator based on a specific time of day. This feature uses the ME-ARC's internal clock to start and stop the generator at the selected times.

Info: Ensure the remote's clock is correct. If needed, refer to the ME-ARC owner's manual for guidance on setting the time on the remote clock.

Info: The ME-ARC clock is powered from the inverter thru the remote cable. If the ME-ARC or inverter loses power, the clock will lose the correct time and must be reset.

- **Set Gen Run Time** – This setting allows set times to be established to turn the generator on and off each day. Select *ON* to set specific times of day to start and stop the generator.

  Default setting: *Set Gen Run Time = OFF*

  - **Set Start Gen Hour** – Set the hour the gen will start each day.
  - **Set Start Gen Minute** – Set the minute the gen will start each day.
  - **Set Start Gen AM-PM** – Set the time period the gen will start.
  - **Set Stop Gen Hour** – Set the hour the gen will stop each day.
  - **Set Stop Gen Minute** – Set the minute the gen will stop each day.
  - **Set Stop Gen AM-PM** – Set the time period the gen will stop.

Why should I set a specific time of day to start/stop the generator? Starting and stopping at a particular time of day can be useful if you want to run the generator for other uses while charging the batteries. You may require the generator to run a heavy load (like a well pump or machinery) every day at the same time. You may also want the generator to run after you leave for work each day to avoid having to hear it running.

SETUP: 04C Gen Run Amps Menu

This menu starts the generator based on the amount of AC amps needed to handle the load the inverter is running. The METER button's *02C Load Amps* menu is used to determine how much load the inverter is currently running when in Inverter mode.

Info: The *04C Gen Run Amps* menu is only applicable to Magnum's MS-PAE and ME-PE Series inverters.

Why use Gen Run Amps? This setting is useful when there is a large load or a combination of loads that the inverter can run, but doing so quickly depletes the battery bank (motors, well pumps, A/C units, freezer, etc.).

- **Set Start Gen AC Amps** – This setting determines when the generator would start depending on the AC amps level of the load the inverter is running. In order for the generator to autostart, the load's amps level must be maintained continuously above the *Start Gen AC Amps* setting for the duration of the *Start Amps Delay* setting.

  Default setting: *Set Start Gen AC Amps = OFF*

  Range: *OFF, 5 - 60 Amps*
- **Set Start Amps Delay** – This setting determines the amount of time that the inverter load's current must continuously remain above the *Start Gen AC Amps* setting for the AGS to initiate an autostart.

  Default setting: *Set Start Amps Delay = 120 Seconds*

  Range: *0 - 127 Seconds, 1 - 127 Minutes*
- **Set Stop Gen AC Amps** – This setting determines when the generator would stop depending on the drop in the AC amps needed for the load the inverter is running. In order for the generator to autostop, the load amps level must drop continuously below the *Stop Gen AC Amps* setting for the duration of the *Stop Amps Delay* time setting.

  Default setting: *Set Stop Gen AC Amps = 20 Amps*

  Range: *5-59 Amps*
- **Set Stop Amps Delay** – This setting determines the amount of time that the AC load must be continuously smaller than the *Stop Gen AC Amps* setting before the generator automatically stops.

  Default setting: *Set Stop Amps Delay = 120 Seconds*

  Range: *0 - 127 Seconds, 1 - 127 Minutes*

Where should I set Gen Run Amps? Typically, the generator should start when the AC load amps is >70-75% of the inverter AC current output rating[1]. This keeps the inverter from running too large a load and also keeps the batteries from cycling unnecessarily. Set *Stop Gen AC Amps* just below the start amps to ensure the large load has turned off. Set the start delay time so surge loads don't trigger a false start, and the stop delay time is long enough to ensure the load has turned off.

Amps Start/Stop Example: In this scenario, most AC loads typically do not exceed 20A when in Inverter mode. When a freezer or well pump starts, the load exceeds 30A so the battery voltage starts to drop quickly. Instead of cycling the batteries to a low voltage, set *Start Gen AC Amps* to *25A* with a *60*-second delay (using *Set Start Amps Delay* menu). Set the *Stop Gen AC Amps* menu to *20A* with a *60*-second delay (using *Set Stop Amps Delay* menu). After 60 seconds of detecting a larger than 25A load on the inverter, the generator autostarts and powers the loads and recharges the batteries. Once the AC amps load drops below 20A for 60 seconds, the gen will turn off.

SETUP: 04D Gen Run SOC Menu

Info: This feature requires the optional ME-BMK (Battery Monitor Kit). Refer to your ME-BMK owner's manual to operate.

This menu starts and stops the generator based on the SOC (State of Charge) reading from the attached battery monitor (see ME-BMK owner's manual) as shown on the METER button's *04A BMK SOC* display. This is considered the

***Note[1]** – For a 4000 watt inverter, this means setting Start Gen AC Amps at 25A.*

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best overall method for using AGS settings to start and stop your generator. The BMK already uses voltage, time, and current to determine the true SOC of the batteries, so little guesswork is needed to determine the settings.

- **Set Start Gen SOC** – This menu is used to set the SOC level for autostarting the generator.

  Default setting: *Set Start Gen SOC = OFF*

  Range: *OFF, 20% - 90%*

- **Set Stop Gen SOC** – This menu is used to set the SOC level for autostopping the generator.

  Default setting: *Set Stop Gen SOC = 90%*

  Range: *21% - 100%*

Info: There is no start or stop delay time needed since the ME-BMK already displays an accurate state of charge of the batteries.

Where should I set Gen Run SOC? Most battery manufacturers recommend that for optimum life, deep-cycle batteries should not be discharged below 50% SOC. The ME-BMK determines the battery's SOC by using a DC shunt to measure the flow of current in and out of the battery. The SOC meter gives you an accurate reading of remaining capacity in the battery bank. Set the *Start Gen SOC* level to 50%, or to 60% if you do not want to discharge the batteries quite as much. When considering the *Stop Gen SOC* setting, keep in mind that running the generator past 90% SOC delivers very little current to get that last 10% into the batteries. Thus, it is common to stop the generator at 90% to save fuel and run time on the generator. However, if the SOC stop setting is less than 100%, the batteries should be charged to 100% as often as possible (~ once a week, or every other discharge cycle) in order to avoid sulfation of the battery plates.

SETUP: 04E Gen Run Temp Menu

This menu allows you to set and enable a temperature value that will automatically start the generator — typically to power an air conditioner for cooling — based on an increase in temp, or by using an A/C thermostat control.

Info: The optional ME-PT1 or ME-PT2 pigtail adapters can be used to connect an A/C or relay control circuit. For more information, refer to the instruction sheet for each pigtail adapter (part number 64-0025 for ME-PT1 instructions, or 64-0026 for ME-PT2 instructions).

Info: This temperature autostart feature requires that the AGS's remote temp sensor cable (Figure 1-2) or an optional ME-PT1 or ME-PT2 pigtail adapter be connected to the AGS's REMOTE port (Figure 2-3). When using the remote temperature sensor, the location of the temperature sensor determines the area being monitored for temperature.

- **Set Gen Run Temp Start** – This menu is used to enable and set the temperature that triggers a generator autostart.

  65F - 95F (18C - 35C) – These settings determine the rising temperature value that triggers a generator temperature autostart.

  Ext Input – This setting is used when an optional pigtail adapter (ME-PT1, or ME-PT2) is used. When an AGS pigtail adapter is connected to the AGS's REMOTE port, an external command — either from a thermostat connection on an air conditioner control circuit or an external relay control circuit — is recognized and causes the generator to start.

Default setting: *Set Gen Run Temp Start = OFF*

Range: *OFF, Ext Input, 65F - 95F or 18C - 35C (5 deg. increments)*

Info: If the temperature start feature is not needed, ensure this setting is set to the *OFF* position.

- **Set Gen Run Temp Time** – This menu sets the amount of time the generator runs after a temperature autostart.

  Default setting: *Set Gen Run Temp Time = 2.0 Hrs*

  Range: *0.5 - 25.5 Hrs (0.5 hr increments)*

When the temperature around the remote temp sensor (per the *METER: 03D AGS Temp* display) increases to the *Gen Run Temp Start* setting, the generator immediately starts and runs based on the *Gen Run Temp Time* setting. When this run time period is finished, the temp sensor reading is checked. If the temperature sensor (or thermostat control – if using the optional pigtail adapter) reading is below the *Gen Run Temp Start* setting, the generator will autostop. If the temperature sensor (or thermostat control) reading is above the *Gen Run Temp Start* setting, the generator will continue to run for a second run time period. At the end of this second run time period, the temperature sensor reading (or thermostat control) is checked again. This cycle continues as long as the *CTRL: 03 Gen Control* menu is set to *AUTO*, or the *SETUP: 04F Max Gen Run Time* setting is reached, whichever occurs first.

Why should I use Gen Run Temp? Typically, in a mobile application such as in an RV or on a boat where the air conditioning (A/C) unit is too much power for the inverter to run from the batteries, this feature is used to start a generator to run the A/C unit. Many RV and marine customers travel with pets and they do not want to leave the pets inside on a hot day. With this feature, you could set the A/C unit to turn on and leave. Whenever the inside temperature rises to the start setting, the generator autostarts to provide power to the A/C unit. This would keep the area cool and comfortable – plus, while the generator is on, the inverter batteries are being charged.

Where should I set Gen Run Temp Start? If using this feature to power an A/C unit, the *Gen Run Temp Start* setting should be slightly above the temperature setting of the thermostat controlling the air conditioner unit. Once the *Gen Run Temp Start* setting is reached, the gen starts providing power to the A/C unit. The reason the *Gen Run Temp Start* is set above the A/C unit's thermostat setting is to ensure the A/C unit runs when the generator starts. If the *Gen Run Temp Start* setting is below that of the A/C unit's thermostat setting, the generator runs but the A/C unit is not calling for a run period or cooling. In other words, your generator is running but the power is not being used by the A/C unit – resulting in wasted fuel and run time.

Info: If using the temperature autostart feature to start a generator that is powering two air conditioners, it is suggested that the second air conditioner's thermostat be set 2° to 5° higher than the first air conditioner. This staggered setting allows the first air conditioner to start and run in an effort to keep the coach cool. If the temperature continues to rise inside the coach, the second air conditioner turns on.

How long should I set the Gen Run Temp Time? When using the temperature autostart feature, the generator autostarts and runs until the *Gen Run Temp Time* setting or the *SETUP: 04F Max Gen Run Time* setting is reached, whichever occurs first. This means you could set the time to the lowest time setting (*0.5 Hrs*), knowing the generator will attempt to run until the temperature setting is met.

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SETUP: 04F Max Gen Run Time Menu

This menu is used to set the maximum time the generator will run if the generator has been started by one of the AGS's autostart settings.

- **Set Max Gen Run Time** – Set this to the maximum amount of time you want the generator to run once it has been autostarted.

  Default setting: *Set Max Gen Run Time = 12.0 Hrs*

  Range: *OFF*, 0.1 - 25.5 Hrs (0.1 hr increments)*

***** *The Max Gen Run Time setting can only be turned off using a ME-AGS-N with Rev ≥5.2, and a ME-ARC with Rev ≥2.3.*

Why should I use Max Gen Run Time? This setting is used to ensure the generator does not run longer than desired after an autostart. Setting a max run time ensures the generator stops if the autostop setting cannot be satisfied. For example, if the fuel capacity of your generator is 5 hours, set the *Max Gen Run Time* setting to *4.5 hours* to ensure it does not run out of fuel.

Info: When the generator autostarts from one of the autostart settings, it will autostop when the autostop parameter for that particular setting has been satisfied. For example, if the generator starts due to the *04A Gen Run VDC* menu's autostart setting, it then stops once it satisfies the *Stop Gen Volts* autostop setting. However, the *Max Gen Run Time* setting overrides <u>any</u> autostop setting. If the generator stops because the *Max Gen Run Time* setting has been reached, the *Fault MaxRun* status will occur. If this happens, you may have to increase the *Max Gen Run Time* setting or adjust the autostop setting to finish sooner. If multiple autostart settings are set in the *04 AGS Setup* menus and a *Fault MaxRun* status occurs, refer to the METER button's *03A AGS Status* menu to identify which condition autostarted the generator. This way you will know which auto condition is running longer than the *Max Gen Run Time* setting.

Info: The *Max Gen Run Time* menu uses the METER button's *03C Gen Run Time* display to determine the generator's run time.

Info: If the generator is stopped due to the *Max Gen Run Time* parameter being met, the status becomes *Fault MaxRn* and the generator will not autostart again until you clear the fault.

SETUP: 04G Quiet Time Menu

This menu is used to enable the Quiet Time feature, and to set the period of time each day in which the generator is not allowed to automatically run. The Quiet Time start setting will prevent the generator from starting even if one of the start parameters is met. If any autostart parameter in the *04 AGS Setup* menus has been met and the generator is running when the Quiet Time start setting is reached, the generator will turn off. The generator will not try to autostart until the Quiet Time stop setting has been reached and an autostart condition is once again satisfied.

The ME-ARC contains a real time clock that <u>must</u> be set for proper operation of the *SETUP: 04G Quiet Time Menu* feature.

- **Set Quiet Time** – Set to *On* (allows you to set the start and stop times).

  Default setting: *Set Quiet Time = OFF*

  Range: *OFF, ON,* [daily start and stop time settings *(12:00AM-12:00PM)*]

- **Set Start Quiet Hour** – Set the hour for Quiet Time to start.
- **Set Start Quiet Minute** – Set the minute for Quiet Time to start.
- **Set Start Quiet AM-PM** – Set AM or PM for the start of Quiet Time.
- **Set Stop Quiet Hour** – Set the hour for Quiet Time to stop.
- **Set Stop Quiet Minute** – Set the minute for Quiet Time to stop.
- **Set Stop Quiet AM-PM** – Set AM or PM for the stop of Quiet Time.

Why should I use Quiet Time? Quiet Time is used when there are park rules or local regulations that prevent generators from running (sleep hrs.). If there are no local rules or regulations, you may not want to use Quiet Time – which would allow the generator to run at any time in a 24-hour period.

Where should I set Quiet Time? Set the Quiet Time start and stop settings to coincide with local noise requirements, or for a specific time period that you do not want the generator to automatically run each day.

- **Set Quiet Time Topoff** – This menu sets the time the generator will autostart and run before Quiet Time starts. The generator will only start on *Quiet Time Topoff* if the battery voltage (or battery SOC[1]) start parameter is within a specified range.

  Default setting: *Set Quiet Time Topoff = OFF*

  Range: *OFF, 30 - 120 Minutes (30 min. increments)*

What is Quiet Time Topoff and why should I use it? The Topoff feature helps ensure the batteries have enough charge to last (i.e., prevent the inverter from shutting down from a low battery condition) through the entire Quiet Time period. When the Topoff feature is enabled by setting a time, the battery voltage (or battery SOC[1]) is monitored just before the start of Quiet Time; and if required, the generator will automatically start to charge the batteries.

This Quiet Time Topoff menu allows you to set a time at which the generator will autostart before Quiet Time starts. This applies whenever the start parameters are close to starting the generator at the start of Quiet Time. If the battery voltage is within 0.3 volts[2] or less of reaching the *04A Gen Run VDC* start parameter, the generator will autostart. The Quiet Time Topoff feature will also autostart the generator if the battery's SOC is within 4% or less of reaching the *04D Gen Run SOC* start parameter[1].

Scenario example (Topoff based on battery voltage): The *04A Gen Run VDC* menu is set to start at 11.5 VDC, Quiet Time is set to start at 10PM, and the *Quiet Time Topoff* setting is *60 min*. At 9PM, the battery voltage reaches 11.8 VDC; because the Quiet Time Topoff feature is enabled (60 min.), the generator autostarts to allow the batteries to charge for 60 minutes before Quiet Time turns the generator off.

Scenario example (Topoff based on battery SOC[1]): The *04D Gen Run SOC* menu is set to start at 60%, Quiet Time is set to start at 10PM, and the *Quiet Time Topoff* setting is *120 min*. At 8PM, the battery SOC reaches 64%; because the Quiet Time Topoff feature is enabled (120 min.), the generator autostarts to allow the batteries to charge for 120 minutes before Quiet Time turns the generator off.

Note[1]: *Generator autostarting based on Quiet Time Topoff using battery SOC (State of Charge) parameters requires the optional Battery Monitor Kit (ME-BMK or ME-BMK-NS) to be installed and enabled.*

Note[2]: *This voltage is scaled depending on your battery system; ≤0.3 for 12-volt systems, ≤0.6 for 24-volt systems, and ≤1.2 for 48-volt systems.*

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Where should I set Quiet Time Topoff? Normally, setting *Quiet Time Topoff* to 30 or 60 minutes is a good idea. In cases where the DC or inverter loads are unusually high or the SOC autostart setting is low — which may cause the batteries to be heavily discharged during the Quiet Time period — increase *Quiet Time Topoff* to 90 or 120 minutes; this ensures the batteries receive the maximum charge time before Quiet Time shuts the generator off.

Info: When the generator starts on Quiet Time Topoff, it will continue running until it reaches the Quiet Time start parameter even if the VDC or SOC autostop parameter is reached.

SETUP: 04H Gen Exercise Menu

This menu allows the generator to run (or "exercise") after it has not been operated for a period of time. The generator is automatically started at a pre-selected time whenever it exceeds a set number of days without running. Once the start command is initiated, the generator starts and runs to help it remain operational and to allow the generator's starting battery to be charged.

Info: The ME-ARC contains a real time clock that must be set for proper operation of the *SETUP: 04H Gen Exercise* menu feature.

- **Set Gen Exercise Days** – This menu sets the maximum number of days the generator is allowed to sit without running. If the generator has not run in this number of days, the exercise parameters will start the generator. The *Set Gen Exercise Days* setting must be between 1-255 days in order to enable the Gen Exercise feature.

  Default setting: *Set Gen Exercise Days = OFF*

  Range: *OFF, 1 - 255 Days*

  - **Set Exercise Run Hour** – Set the hour the generator will start.
  - **Set Exercise Run Minute** – Set the minute the generator will start.
  - **Set Exercise Run AM-PM** – Set AM-PM when the generator starts.
  - **Set Exercise Run Time** – Set how long the generator will run for the exercise period.

  Default setting: *Set Exercise Run Time = 1.0 Hrs*

  Range: *0.0 - 25.5 Hrs (0.1 hr increments)*

Why should I use the Gen Exercise feature? Most generators are very dependable and provide years of service if properly maintained. Exercising your generator is one of the most overlooked aspects of routine maintenance, yet its the simplest to perform. Regularly exercising your generator keeps engine seals and components lubricated, prevents oxidation of electrical contacts, uses up fuel before it deteriorates, heats up the generator windings to eliminate moisture buildup, helps ensure the generator's starting battery is maintained at an optimal state of charge, and, in general, helps provide reliable engine starting. If long periods of time elapse without using your generator (remains connected to external AC power), or if you only use your generator a few days out of the year, enabling the Gen Exercise feature is recommended. However, if you run your generator frequently throughout the year, you may not need to use the Gen Exercise feature.

How often and how long should I exercise my generator? To maximize reliability and minimize repairs, it is important to exercise your generator at least once a month. This applies to both gas and diesel generators. When generators sit unused for as little as 30 days moisture can build up, and may damage your generator. Also, the fuel in gasoline-powered generators can

begin to break down into gums and varnishes that clog the fuel system. Fuel varnishing results in hard starting and surging – a surging generator may not settle at a stable operating speed. Always check with your generator's manufacturer to determine how to properly exercise your generator. Generally, it is recommended that you run the generator every month for two hours under at least half the rated load. For example, with a 5,000 watt generator, turn on a load(s) that is about 2,500 watts, and let it run continuously for two hours. It is always best to run the generator for longer periods of time rather than for multiple short periods.

How does this Gen Exercise feature work? The Gen Exercise feature allows the generator to autostart at a pre-selected time whenever it has not run for a set number of days.

Once the Gen Exercise feature is enabled (by setting how many days to wait before exercising the gen under *Set Gen Exercise Days*), the generator will start and begin exercising only after two conditions are met. First, the generator must not have run for a set number of days (i.e., the Days Since Run timer value must be equal to or greater than the *Gen Exercise Days* setting). Second, the generator's exercise time of day (i.e., *Exercise Run Hour/Minute/AM-PM* settings) must occur.

Info: When the generator starts and runs based on the gen exercise criteria, the generator power passes thru the inverter to the inverter loads — if the inverter is enabled to accept AC power on its input — and also charges the inverter batteries (if the charger is enabled).

Info: The Gen Exercise feature identifies the number of days since the generator has last run by using the Days Since Run timer which is shown under the *METER: 03E Since Gen Run* display.

Example of a Gen Exercise Scenario:

Under *SETUP: 04H Gen Exercise Menu*, set to:

Set Gen Exercise Days = 3,

Set Gen Exercise Run Hour, *Minute* and *AM-PM = 8:30A*,

Set Gen Exercise Run Time = 1.0 Hrs

Under *CTRL: 03 Gen Control,* set to *AUTO*.

First required condition: The "Days Since Run" timer must have accumulated up to at least 3 days (*Set Gen Exercise Days = 3*). On Day 1, the generator was manually started and stopped at 2:00PM. The stop time (2:00 PM) is the starting point for the Days Since Run timer to begin counting days – the Days Since Run timer displays *0* days. On Day 2 at 2:00 PM, 24 hours have accumulated since the generator has last run – the Days Since Run timer displays *1* day. On Day 3 at 2:00 PM, 48 hours have accumulated since the generator last ran – the Days Since Run timer displays *2* days. On Day 4 (3rd day since the generator was manually started) at 2:00PM, 72 hours (or 3 days) have now accumulated since the generator has last run – the Days Since Run timer now displays *3* days. The first required condition — which is how many days must pass before the generator hasn't run — has been met.

Second required condition: The remote clock must now go to 8:30 AM (*Set Gen Exercise Run Hour, Minute, and AM-PM = 8:30A*) before the generator can autostart. On Day 5 at 8:30AM (Days Since Run timer displays *3* days), the second required condition is met and the generator automatically starts and runs for 1 hour (*Set Gen Exercise Run Time = 1.0 Hrs*).

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SETUP: 04I Gen Warm-up Time Menu

This menu allows the generator to run (i.e., warm up) before it connects to the inverter/charger, or powers the battery charger and any pass-thru loads. Most generators need to warm up before a load is supplied.

- **Set Gen Warm-up Time** – This setting is the amount of time the generator is allowed to warm up before connecting to the inverter/charger.

  Default setting: *Set Gen Warm-up Time = 60 sec.*

  Range: *0 - 127 Seconds, 1 - 127 Minutes*

Where should I set Gen Warm-up Time? Check with your generator manufacturer. Typically, smaller generators (~2-3KW) need at least 60 seconds before applying a load; larger generators require a longer warm-up time.

SETUP: 04J Gen Cooldown Time

This menu allows the generator to continue to run after it disconnects from the inverter/charger and prior to autostopping (i.e., cooldown). Allowing the generator to cool down after the load is disconnected helps to prolong generator engine life.

- **Set Gen Cooldown Time** – This setting is the amount of time the generator is allowed to cool down after it disconnects from the inverter/charger.

  Default setting: *Set Gen Cooldown Time = 60 sec.*

  Range: *0 - 127 Seconds, 1 - 127 Minutes*

Where should I set Gen Cooldown Time? Check with your generator manufacturer. Most generators need at least 60 seconds to cool down after being disconnected from a load.

Info: The warm-up and cooldown features prevent the generator from connecting to the inverter's AC input. Since the inverter has only a single-source input, it cannot distinguish between grid or generator input. So, during warm-up or cooldown, the inverter will prevent any AC input from connecting. When either warm-up or cooldown is activated, it will disconnect any AC source connected to the inverter's AC input (i.e., grid or generator) until the time period (warm-up or cooldown) is over.

9.2 ME-AGS-N Functional Tests using the ME-ARC

Once you have used the ME-ARC to establish all the autostart/autostop settings you need, perform the following tests to verify that the AGS system is functioning correctly and there is communication between the remote/inverter and the ME-AGS-N.

9.2.1 Remote to Generator Communication Test

This section describes using the ME-ARC remote to start the generator and to determine the current AGS status.

9.2.1.1 Determining AGS Status

Use your remote control to determine the AGS's status by pressing the METER button until the bottom line displays "*01 DC Meters*", rotate the SELECT knob to the *03 AGS Meters* menu, and then press the SELECT knob (top line shows *03A AGS Status* and the bottom line displays the current status of the AGS, i.e., *Ready*). An AGS status of *Off* or *Ready* indicates the remote/inverter is correctly communicating with the AGS. If the AGS status displayed is not *Off* or *Ready*, then refer to Section 12.2 "Resolving Operational Statuses" or Section 12.3 "ME-AGS-N Faults using your Remote" for assistance before continuing.

9.2.1.2 Starting the Generator from the Remote

To confirm that the generator will turn on and run from the remote, first ensure the AGS status is "*Off*" or "*Ready*" (see Section 9.2.1.1). Then:

1. Press the CTRL button, and rotate the SELECT knob to the *03 Gen Control* menu.
2. Press the SELECT knob, and then rotate it to the *ON* setting.
3. Press the SELECT knob to activate the generator test.

Once the generator starts, it should run until you change the *03 Gen Control* menu to "*OFF*" (before turning off). After two minutes, view the STATUS LED and ensure it turns solid green (a solid green STATUS LED means the generator has started successfully and is providing the gen run sense signal to the AGS module).

Note: If the generator attempted to start but did not run, continue to wait, the AGS will attempt to start the generator 3 more times.

If your AGS/generator system started (may attempt an autostart 4 times), ran, and the STATUS LED came on and stayed on (not blinking), then the wiring from the AGS to the generator is correct. You are now ready to enable the AGS by setting the *03 Gen Control* setting in your remote to *AUTO* (see Section 9.3.1).

Info: The AGS attempts to start the generator 4 times. If after 4 attempts the generator fails to start, the STATUS LED turns red – indicating a fault.

If a generator fault displays or the AGS module's STATUS LED shows a fault condition (solid red LED indication), refer to Section 12.0 for assistance.

9.3 ME-AGS-N Operation / Monitoring using the ME-ARC

This section provides the menus under the ME-ARC's CTRL, METER, and TECH buttons that determine how to control and operate the generator. The section also includes menus that are used to help monitor the AGS and the generator's starting and running conditions.

9.3.1 Controlling the AGS using the ME-ARC

The AGS uses the *CTRL: 03 Gen Control* menu to activate the generator either manually or automatically. Press the CTRL button on the ME-ARC remote and rotate the SELECT knob to the *03 Gen Control* menu.

CTRL: 03 Gen Control

This menu is used to manually turn the connected generator on and off, or to select the *AUTO* feature which enables the active generator autostart and autostop settings to control the connected generator. Available options are:

OFF: The *OFF* selection turns the generator off if it is running from either a manual "on" command or an autostart command. When *OFF* is selected, the AGS is prevented from starting the generator automatically (default).

Info: When "*OFF*" is selected, the AGS turns off immediately without any cooldown time (if set).

Info: If DC power is lost to the remote or to the inverter system, this menu resets to the default *OFF* position for safety.

Info: If the generator is manually started from the generator control panel or a generator remote panel, selecting *OFF* may not shut down the generator.

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ON: The *ON* selection manually starts the generator by sending a "start" command from the AGS module. Once the generator is started, it must be manually stopped, either from an external stop switch or by selecting *OFF* from the 03 *Gen Control* menu, which sends a "stop" command from the AGS module.

Info: When "*ON*" is selected, the Magnum inverter will not attempt to accept the generator AC voltage until the warm-up period is satisfied.

Info: You can manually start the generator and have it automatically stop by selecting *ON* from the *03 Gen Control* menu, and then changing the selection to *AUTO* to automatically stop the generator. When *AUTO* is selected after the generator has been manually started, it displays the AGS status as "*Start VDC*" and uses the stop setting in the SETUP button's *04A Gen Run VDC* menu (even if not active) or the *04F Max Gen Run Time* menu, whichever occurs first. This is useful if you want to make sure the generator starts before you leave; the *Max Gen Run Time* setting ensures the generator does not run longer than required.

AUTO: This selection uses the settings from the SETUP button's *04 AGS Setup* menus to automatically start and stop the generator. Refer to the *04 AGS Setup* menus in Section 9.1 to set the start and stop parameters for the generator.

9.3.2 Monitoring the AGS using the ME-ARC

The ME-ARC remote's METER and TECH buttons have additional menus that are helpful for the proper operation and monitoring of your AGS system.

9.3.2.1 ME-ARC Remote's AGS METER Button

Press the ME-ARC remote's METER button, rotate the SELECT knob to the *03 AGS Meter* menu, and then press the SELECT knob to access the AGS Meter read-only menus. Rotate the SELECT knob to view the various AGS meters.

METER: 03A AGS Status Menu

This read-only menu displays the AGS's current status. There are 26 different status messages that can display to identify what state the AGS is currently in – only one displays at any one time (refer also to Figure 9-2).

Available statuses are (see Tables 11-1 thru 11-3 for information on each):

- AC In
- Gen Cooldown
- Gen Warm-up
- Manual Run
- No Comm
- Off
- Quiet Time
- Ready
- Start Amp
- Start Exercise
- Start SOC
- Start Temp
- Start Test
- Start Time
- Start Topoff
- Start VDC
- Gen Run Fault
- Fault Amp
- Fault Exercise
- Fault MaxRn
- Fault SOC
- Fault Temp
- Fault Test
- Fault Time
- Fault Topoff
- Fault VDC

Info: This menu is important when determining if the AGS is working correctly, or for troubleshooting an AGS installation. For any fault mode displayed in the status menu, refer to Section 12.0 in this manual.

METER: 03B DC Volts-AGS Menu

This read-only menu displays the DC voltage measured at Terminals #3 and #4 of the AGS module. This menu is useful in setting up the voltage start for the AGS, and for troubleshooting its operation.

Info: The DC voltage reading in this menu may vary from the DC voltage readings in the METER button's *01A DC Volts* and *04C DC Volts-BMK* menu items. When troubleshooting, read the appropriate related meter for each device. When troubleshooting the AGS, use the *03B DC Volts-AGS* menu for verification and testing purposes.

METER: 03C Gen Run Time Menu

This read-only menu displays the length of time the generator has been running since it was autostarted by the AGS. This helps determine how long the generator has been running in Auto mode if you were not present when it started. This menu is enabled when *CTRL: 03 Gen Control* is set to *AUTO*, but does not display run time when the generator has been manually started. Cooldown and warm-up times are not included in the gen run time display.

Info: The *Gen Run Time* menu's timer is started when the gen run sense voltage/signal is correct and qualified at the AGS module. It is not considered qualified until after a full start attempt and the *Gen Warm-up Time* setting is satisfied. Cooldown and warm-up times are not included in the gen run time display. Total generator run time = *Gen Run Time + Gen Warm-up Time + Gen Cooldown*.

Info: The times in this display are shown in tenths of an hour (0.0 hrs., 0.1 hrs., etc.,) – thus, 0.1 hrs. = 6 minutes.

Info: The *Gen Run Time* display resets to 0.0 each time the generator is autostopped. This meter is not designed to replace the hour meter for total hours the generator has run.

Info: This display is used by the *SETUP: 04F Max Gen Run Time* menu to determine the generator's maximum run time when started automatically.

METER: 03D AGS Temp Menu

This read-only menu displays the temperature of the AGS remote temp sensor (included with AGS, but use optional), and is helpful in determining its proper placement and operation. This temperature value can be displayed in either Fahrenheit or Celsius depending on the *SETUP: 01E Temp Display* setting. Use this menu to change the temperature format, if required.

METER: 03E Since Gen Run (Days) Menu

This read-only menu displays the number of days since the generator has last run. This is useful in determining if the start and stop settings are set up correctly. This timer begins once the *CTRL: 03 Gen Control* menu is set to *AUTO*, and then counts by 1 for every 24-hour period the generator does not start. The Days Since Run timer resets any time the generator starts, which could be either by autostarting the generator (including from a previous exercise run), or manually starting the generator.

Info: When the DIP switch inside the AGS is set to "2-Wire Standby Mode", if you do not use the ME-ARC to manually turn the generator on, the Days Since Run timer will not be reset to zero.

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9.3.2.2 ME-ARC Remote's TECH Button

Press the ME-ARC's TECH button, and rotate the SELECT knob to access:

TECH: 01 Temperatures

Press the SELECT knob, and then rotate the knob to display the current temperature reading of the AGS's remote temp sensor. If the remote temp sensor is not installed, "*AGS TS Open*" displays.

TECH: 02 Revisions – AGS

Press the SELECT knob, and then rotate the knob until the AGS module software version is shown on the screen (i.e., *AGS: 5.2*).

Info: The AGS may display a "*0.0*" revision for several reasons. Either the AGS is not installed, there is no communication because of a bad/miswired network cable, or the AGS is not powered or is bad.

9.4 Enabling the ME-AGS-N using the ME-ARC

Before the AGS can begin operating/monitoring for an autostart condition (using active AGS settings in your ME-ARC remote control), it must be enabled.

To enable the AGS:

1. Press the CTRL button on the ME-ARC remote, and then rotate the SELECT knob to the *03 Gen Control* menu.
2. Press the SELECT knob. The *Set Gen Control* screen displays with the current gen control setting and an arrow to the right.
3. Turn the SELECT knob to the *AUTO* setting.
4. Press the SELECT knob again to select this setting. The selection arrow appears to the right of the screen.

The AGS is now ready to automatically start/stop the generator once an autostart condition is satisfied.

Note: If power is lost to your remote, the AGS control setting will return to the default *OFF* setting. Once power is restored, you must enable the AGS again.

Note: Despite enabling the AGS, you must check the AGS's current status (under *METER: 03A AGS Status*) and ensure the status displays as "*Ready*".

9.5 Starting and Stopping the Generator using the ME-ARC

The generator can be manually started/stopped, as well as autostarted/autostopped using the available settings from your ME-ARC.

To autostart / autostop the generator:

In order for the generator to autostart/autostop, one or more of the following autostart/autostop conditions must be pre-set (see Section 9.1):

Autostart Conditions

- 04A Gen Run VDC (pp. 42-44)
- 04B Gen Run Time (p. 44)
- 04C Gen Run Amps (pp. 44-45)
- 04D Gen Run SOC (pp. 45-46)
- 04E Gen Run Temp (pp. 46-47)
- 04G Quiet Time (pp. 48-50)
- 04H Gen Run Exercise (pp. 50-51)

Autostop Conditions

- 04A Gen Run VDC (pp. 42-44)
- 04B Gen Run Time (p. 44)
- 04C Gen Run Amps (pp. 44-45)
- 04D Gen Run SOC (pp. 45-46)
- 04E Gen Run Temp (pp. 46-47)
- 04F Max Gen Run Time (p. 48)
- 04G Quiet Time (pp. 48-50)
- 04H Gen Run Exercise (pp. 50-51)

To manually start the generator:

1. Press the CTRL button.
2. Turn the SELECT knob to the *03 Gen Control* menu.
3. Press the SELECT knob. The *Set Gen Control* menu displays with an arrow to the right of the current setting.
4. Turn the SELECT knob to the *ON* setting.
5. Press the SELECT knob again to select this setting. The selection arrow appears to the right of the screen. The generator should start at this time.

If the generator does not start as expected, refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.

To manually stop the generator:

1. Press the CTRL button.
2. Turn the SELECT knob to the *03 Gen Control* menu.
3. Press the SELECT knob. The *Set Gen Control* menu displays with an arrow to the right of the current setting.
4. Turn the SELECT knob to the *OFF* setting.
5. Press the SELECT knob again to select this setting. The selection arrow appears to the right of the screen. The generator should stop at this time.

If the generator does not stop as expected, refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.

To manually start the generator and have it automatically stop:

1. Press the CTRL button.
2. Turn the SELECT knob to the *03 Gen Control* menu.
3. Press the SELECT knob. The *Set Gen Control* menu displays with an arrow to the right of the current setting.
4. Turn the SELECT knob to the *ON* setting.
5. Press the SELECT knob again to select this setting. The selection arrow appears to the right of the screen. The generator should start at this time.

Once the generator is running, rotate the SELECT knob to *AUTO* (under the *03 Gen Control* menu), and then press the SELECT knob to select this setting.

If the generator does not start or stop as expected, refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.

Note: When the generator is manually started, but then changed to autostop, the *SETUP: 04A Gen Run VDC* settings are used to determine when the generator will autostop. If the *SETUP: 04A Gen Run VDC* is set to *OFF*, the *Start/Stop Volts Delay* and *Stop Gen Volts* values that were entered prior to selecting *OFF* will still be used to autostop the generator.

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9.6 ME-AGS-N Menu Map using the ME-ARC

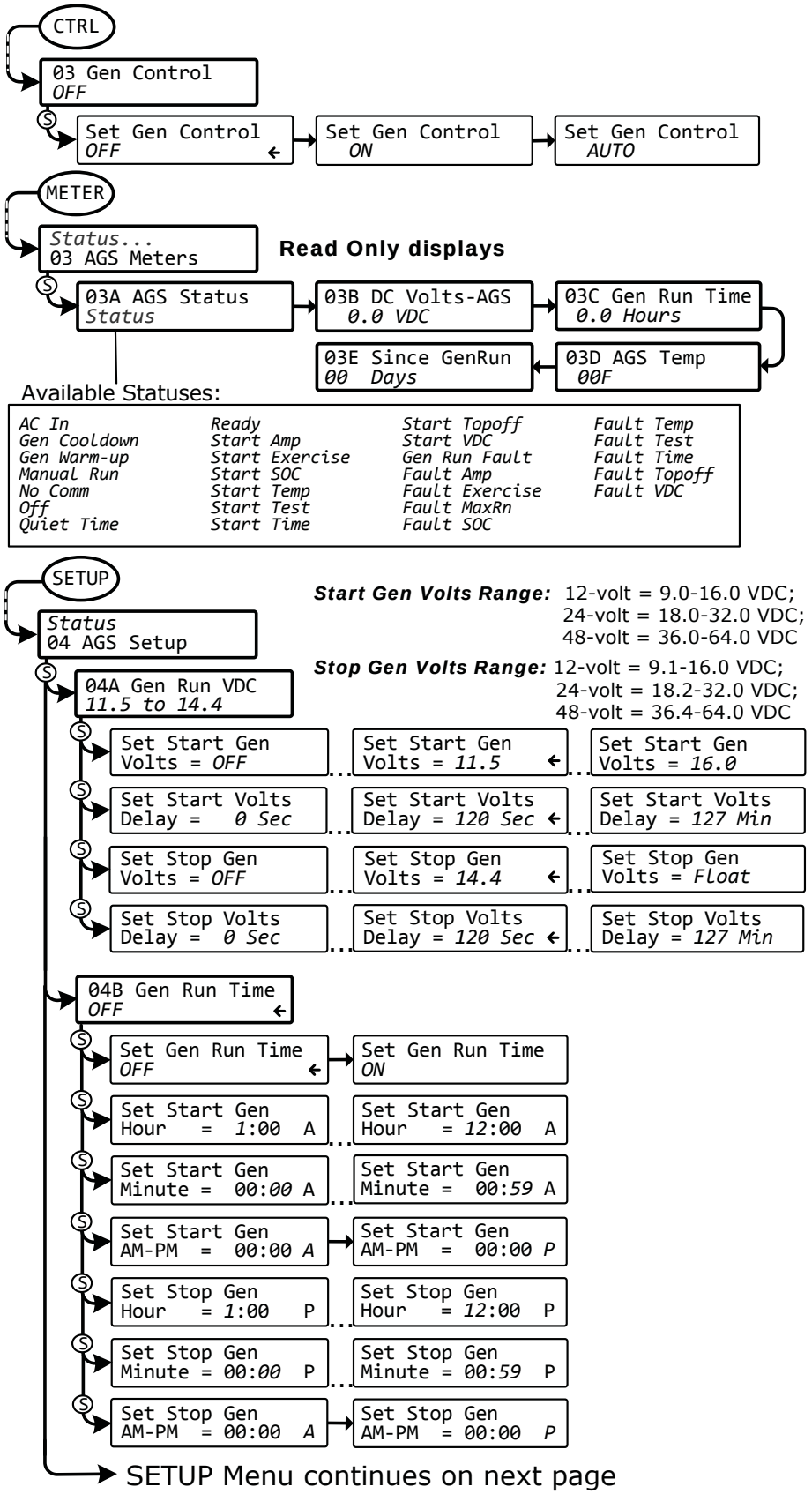

Figure 9-2, AGS Menu Maps in ME-ARC Remote (Section 1)

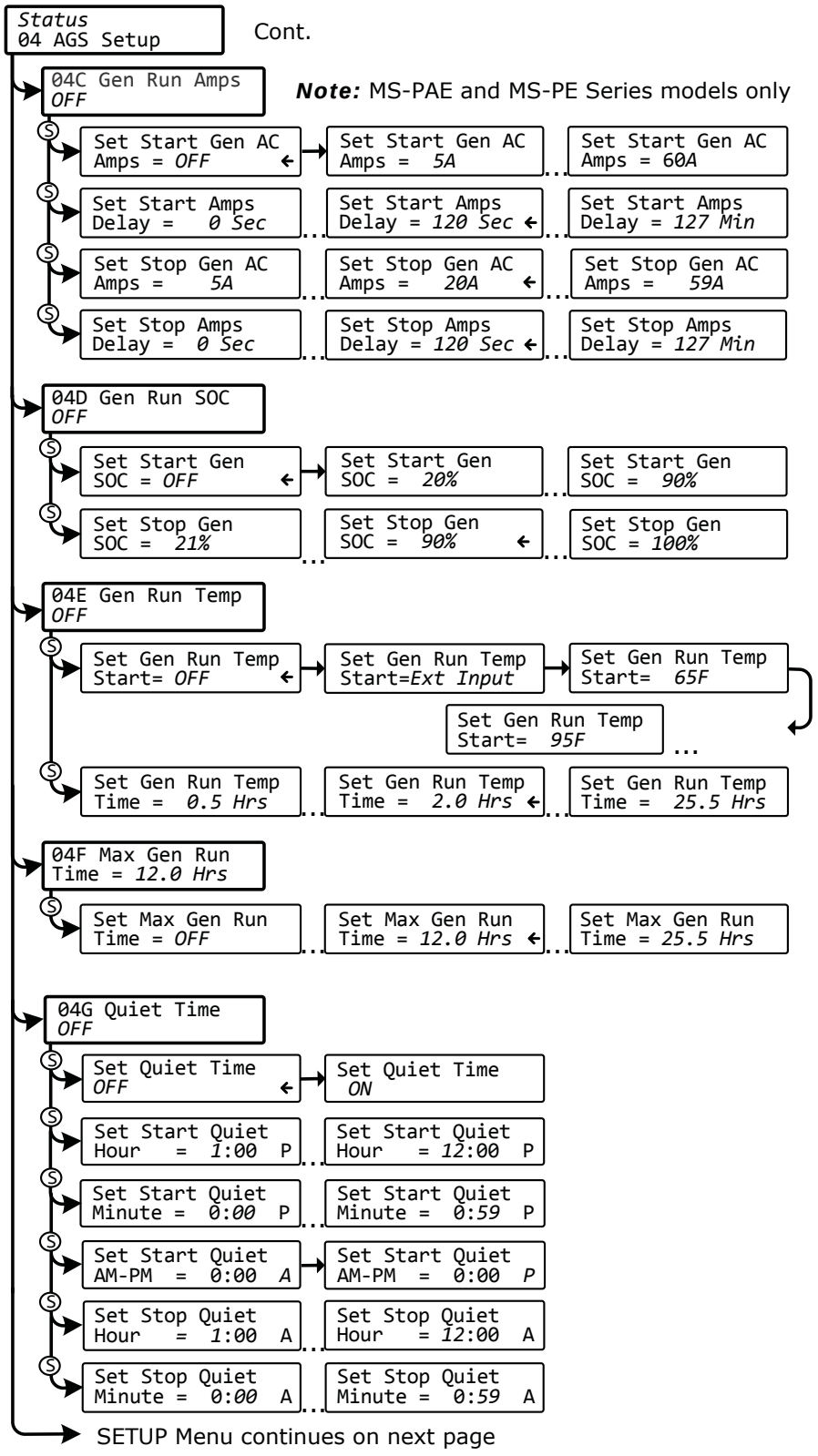

Figure 9-3, AGS Menu Maps in ME-ARC Remote (Section 2)

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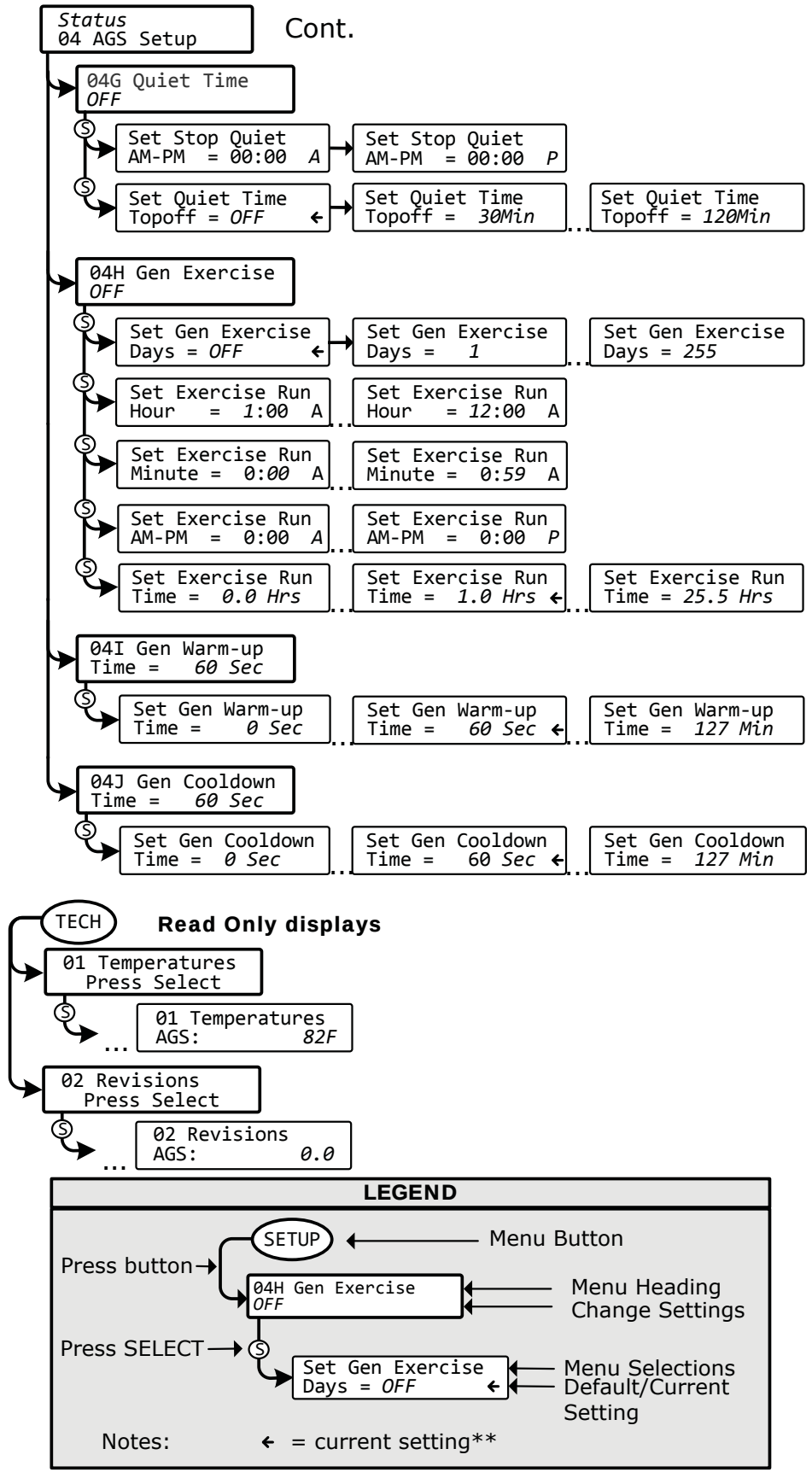

** For this menu map, the arrow denotes the factory default settings

Figure 9-4, AGS Menu Maps in ME-ARC Remote (Section 3)

10.0 Using the ME-RTR Router

The ME-RTR router's AGS menus under the CTRL, METER, SETUP, and TECH buttons allow you to customize and monitor operating parameters, and to help troubleshoot your autostart/autostop generator system. To configure and use the AGS with the ME-RTR, refer to the mini index below to direct you to the appropriate section.

Info: The ME-RTR router used in this section is ≥Rev. 2.1. Refer to your router's owner's manual to determine your router's revision (or see Section 10.3.2.3 "ME-RTR Router's TECH Button" on page 77).

Info: The ME-RTR is a multi-inverter remote that allows a single-inverter remote (ME-RC or ME-ARC) to be connected. When connected to the ME-RTR, the single-inverter remote acts only as a remote monitor, but will allow the AGS to be activated. Even though you can activate the AGS with a ME-RC or ME-ARC connected to the ME-RTR, the AGS's autostart/autostop settings are obtained from the ME-RTR.

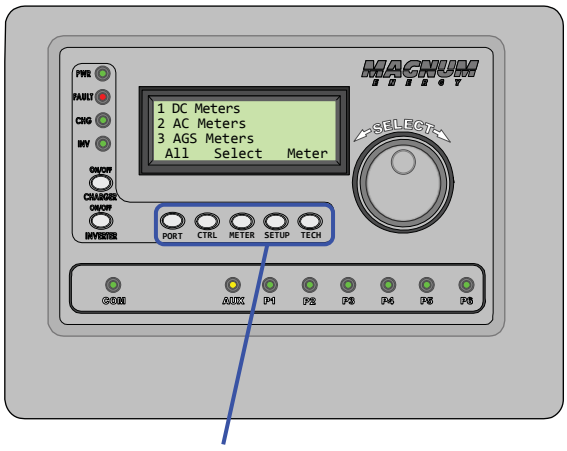

Figure 10-1, ME-RTR's AGS Configuration Access Buttons

10.1 ME-AGS-N Setup using the ME-RTR

To access the AGS SETUP menus, press and hold the METER button (~3 seconds) to display the System Home screen. From the System Home screen, press the PORT button, or rotate the SELECT knob to the port# where the AGS is connected (AGS Home screen), and then press the SETUP button. The menus available from this screen allow the generator to be automatically started and stopped based on many different conditions. From Table 10-1, determine the specific autostart and autostop conditions with which you want to control the generator.

Info: For information on using the PORT, CTRL, METER, and TECH button menus to operate and monitor the AGS, refer to Section 10.3 "ME-AGS-N Operation/Monitoring using the ME-RTR".

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Table 10-1, ME-RTR Autostart / Autostop Matrix

Autostart Condition	Autostop Condition	See Setup Menu	Page
Starts on low battery voltage (DC voltage connected to Terminals #3 and #4)	Stops on higher battery voltage	04A Gen Run VDC	62
	Stops at Float charge after a set time period (using Absorb Done Time setting)	04A Gen Run VDC (Set Stop Gen Volts = Float)	62
	Stops at Float charge after battery current requirement is low (using Absorb Done Amps setting)	04A Gen Run VDC (Set Stop Gen Volts = Float)	62
	Stops at Float charge using a battery SOC setting (using Absorb Done SOC setting)[2]	04A Gen Run VDC (Set Stop Gen Volts = Float)	62
Starts at a set time daily	Stops at a different set time daily	04B Gen Run Time	65
Starts on high AC amps to an inverter load[1]	Stops on lower AC amps to an inverter load[1]	04C Gen Run Amps	65
Starts when the battery State of Charge (SOC)[2] is low	Stops when the battery State of Charge (SOC)[2] is higher	04D Gen Run SOC	66
Starts when temperature increases	Stops after a set time period	04E Gen Run Temp	67

Note[1]: *Only applicable to MS-PAE and MS-PE inverters.*

Note[2]: *Autostart/autostop conditions using SOC require the ME-BMK (battery monitor) to be installed.*

SETUP: 04A Gen Run VDC Menu

This menu starts and stops the generator based on the battery voltage as shown on the METER button's *03B DC Volts-AGS* menu. This menu provides the option to start the generator when the battery voltage gets low, and to stop the generator once the battery reaches a higher voltage level, or has been fully charged and goes into the Float Charge stage. Using voltage is the most common method of automatically starting and stopping the generator because it is considered the simplest and easiest to understand. The *04A Gen Run VDC* menu also has a delay setting to minimize nuisance starts/stops and the short cycle run times of the generator.

- **Set Start Gen Volts** – This setting will start the generator when the battery voltage (on Terminals #3 & #4) decreases to or below this setting continuously for the duration of the *Set Start Volts Delay* setting.

Default setting: *Set Start Gen Volts = 11.5 VDC (12v), 23.0 VDC (24v), 46.0 VDC (48v)*

Range: *OFF, 9.0-15.9 VDC (12v), 18.0-31.8 VDC (24v), 36.0-63.6 VDC (48v)*

Where should I set Start Volts? When setting the VDC start voltage, it must be high enough to not over-discharge the battery, but also low enough to keep from nuisance starting the generator. Typically, start volts is set based on what is determined to be approximately 50% of the battery capacity. Since this is an inverter/battery system, and the battery is normally loaded, the VDC used to determine 50% battery capacity should be set lower than what is shown on typical battery voltage SOC charts (approximately 11-11.5 in a 12-volt system), which show the battery at rest (not loaded).

Example: Using a 12-volt battery as an example, a typical SOC (State of Charge) battery chart will show that 12.2 VDC is considered 50% SOC. This voltage is a battery "at rest," meaning it has no load connected and has been at rest for a minimum of 30 min. While this voltage is accurate under these at rest conditions, this same voltage with a load applied means the battery is well above 50% SOC, and should be set much lower. The larger the battery bank the less the voltage will be affected by a load applied to the battery bank. A typical start voltage setting would be between 11.0 VDC - 11.5 VDC for a 12-volt system.

- **Set Start Volts Delay** – This setting determines how long the *Start Gen Volts* parameter must be continuously maintained before autostarting the generator. This ensures the generator does not nuisance start. By setting a delay, momentary surge loads will not start the generator when the battery voltage dips due to the heavy load applied to the battery.

  Default setting: *Set Start Volts Delay = 60 Seconds*

  Range: *OFF, 1 - 120 Seconds, 3 - 127 Minutes*

Where should I set Start Volts Delay? First, determine what loads will be running when the generator needs to start. The larger the load the shorter the delay time setting. When a large load is applied to the battery bank the battery voltage will drop quickly, so the delay time should be short to ensure the batteries are not over-discharged. If you are not sure what loads might be running or where to set the start time delay, error on the side of setting a shorter time such as the default of 2 minutes (to protect batteries from over-discharge).

- **Set Stop Gen Volts** – This setting will stop the generator when the battery voltage (on Terminals #3 & #4) increases to or above this setting continuously for the duration of the *Set Stop Volts Delay* setting. To allow the battery bank to go through a full Bulk and Absorption charge, this setting should be set to *Float*.

  Default setting: *Set Stop Gen Volts = 14.4 VDC (12v), 28.8 VDC (24v), 57.6 VDC (48v)*

  Range: *OFF, 9.1-16.1 VDC (12v), 18.2-32.2 VDC (24v), 36.4-64.4 VDC (48v), Float*

Where should I set Stop Gen Volts? Typically, when using a generator to charge batteries, most individuals only charge the batteries to 80-85% to compromise between minimizing fuel usage and maximizing battery life. This is done by having the generator start on low battery voltage, and then stop at a higher voltage (i.e., the *Stop Gen Volts* setting). When deciding

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where to set the *Stop Gen Volts* setting, it must be lower than the inverter's *Absorb Voltage* setting (determined by the *SETUP: 03B Battery Type* menu). Otherwise, the charger will enter Absorption Charge mode — which is required to maintain the batteries at a constant voltage level — and the battery voltage will not reach the *Stop Gen Volts* setting, which will cause the generator to run until it is out of fuel or until it reaches the *SETUP: 04F Max Gen Run Time* setting.

Therefore, after reading this some will think that they should just set the *Stop Gen Volts* setting slightly lower than the absorption level to ensure the charger always reaches the *Stop Gen Volts* setting before it goes into the Absorption Charge mode. However, temperature changes can affect the absorb voltage setting[1] and may require you to readjust the *Stop Gen Volts* setting seasonally. If you are in a normally cold climate (<32°F), the actual absorb charge voltage will increase. So, the *Stop Gen Volts* setting should be set well above the absorb voltage setting (~.5V above for 12-volt systems). If you are normally in a hot climate (>95°F), the actual absorb charge voltage will decrease. In that case, the *Stop Gen Volts* setting should be set well below the absorb voltage setting (~.5V below for 12-volt systems).

A simpler way to charge the batteries to 80-85% and to automatically allow a temperature-compensated charge to the batteries (no seasonal adjustment required) is accomplished using the settings below:

- Set the *Stop Gen Volts* setting to *Float*
- Set the *Absorb Volts* setting (*SETUP: 03B Battery Type*) to the voltage level at which you want the generator to turn off (normally *~ 14.5 volts* for flooded batteries in a 12-volt system)
- Set the *Absorb Done Time* setting (*SETUP: 03E Absorb Done Time*) to *0.1 hours* (lowest setting)

Using these settings, when the batteries reach a low voltage level the generator turns on (per the *Start Gen Volts* setting) and charges the battery to the temperature-compensated *Absorb Voltage* setting. After reaching the absorption voltage level, the inverter/charger goes into Absorption Charge mode and is there for only 6 minutes (0.1 hours) before it goes to Float Charge mode. Once the inverter/charger enters Float Charge mode, the AGS will autostop the generator.

Info: Battery life will be reduced if the batteries are only charged to 80-85% regularly. It is highly recommended to charge the batteries to 100% as often as possible (~ once a week, or every other discharge cycle) in order to avoid sulfation of the battery plates. Using the *SETUP: 03E Absorb Done Time* menu, the absorption charge time can easily be changed to a longer duration to increase the batteries' state of charge.

- **Set Stop Volts Delay** – This setting determines the amount of time the generator will run after the *Set Stop Gen Volts* setting has been satisfied.

  Default setting: *Set Stop Volts Delay = 60 Seconds*

  Range: *OFF, 1 - 120 Seconds, 3 - 127 Minutes*

Note[1]: *When the inverter's Battery Temperature Sensor (BTS) is connected, the actual absorb charge voltage will increase or decrease to ensure correct charging as the battery temperature changes.*

SETUP: 04B Gen Run Time Menu

This menu starts and stops the generator based on a specific time of day. This feature uses the ME-RTR's internal clock to start and stop the generator at the selected times.

Info: Ensure the remote's clock is correct. If needed, refer to the ME-RTR owner's manual for guidance on setting the time on the remote clock.

Info: The ME-RTR clock is powered from the inverter thru the remote cable. If the ME-RTR or inverter loses power, the clock will lose the correct time and must be reset.

- **Set Gen Run Time** – This setting allows set times to be established to turn the generator on and off each day. Select *On* to set specific times of day to start and stop the generator.

  Default setting: *Set Gen Run Time = OFF*

  - **Set Start Gen Hour** – Set the hour the gen will start each day.
  - **Set Start Gen Minute** – Set the minute the gen will start each day.
  - **Set Start Gen AM-PM** – Set the time period the gen will start.
  - **Set Stop Gen Hour** – Set the hour the gen will stop each day.
  - **Set Stop Gen Minute** – Set the minute the gen will stop each day.
  - **Set Stop Gen AM-PM** – Set the time period the gen will stop.

Why should I set a specific time of day to start/stop the generator?

Starting and stopping at a particular time of day can be useful if you want to run the generator for other uses while charging the batteries. You may require the generator to run a heavy load (like a well pump or machinery) every day at the same time. You may also want the generator to run after you leave for work each day to avoid having to hear it running.

SETUP: 04C Gen Run Amps Menu

This menu starts the generator based on the amount of AC amps needed to handle the load the inverter is running. The METER button's *02C Load Amps* menu is used to determine how much load the inverter is currently running when in Inverter mode.

Info: The *04C Gen Run Amps* menu is only applicable to Magnum's MS-PAE and MS-PE Series inverters.

Why should I use Gen Run Amps? This setting is useful when there is occasionally a large load or combinations of loads that the inverter is able to run, but by doing so would quickly deplete the battery bank. Typically, these large loads might be motors, well pumps, A/C units, or freezers.

- **Set Start Gen AC Amps** – This setting determines when the generator would start depending on the AC amps level of the load the inverter is running. The load's amps level must be continuously maintained above the *Start Gen AC Amps* setting for the duration of the *Start Amps Delay* setting in order for the generator to autostart.

  Default setting: *Set Start Gen AC Amps = OFF*

  Range: *OFF, 5 - 60 Amps*

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- **Set Start Amps Delay** – This setting determines the amount of time that the inverter load's current must continuously remain above the *Start Gen AC Amps* setting for the AGS to initiate an autostart.

  Default setting: *Set Start Amps Delay = 60 Seconds*

  Range: *OFF, 1 - 120 Seconds, 3 - 127 Minutes*

- **Set Stop Gen AC Amps** – This setting determines when the generator would stop depending on the drop in the AC amps needed for the load the inverter is running. The load amps level must continuously drop below the *Stop Gen AC Amps* setting for the duration of the *Stop Amps Delay* setting in order for the generator to autostop.

  Default setting: *Set Stop Gen AC Amps = 10 Amps*

  Range: *0-60 Amps*

- **Set Stop Amps Delay** – This setting determines the amount of time that the AC load must be continuously smaller than the *Stop Gen AC Amps* setting before the generator automatically stops.

  Default setting: *Set Stop Amps Delay = 60 Seconds*

  Range: *OFF, 1 - 120 Seconds, 3 - 127 Minutes*

Where should I set Gen Run Amps? Typically, the generator should start when the AC load amps is >70-75% of the inverter AC current output rating[1]. This keeps the inverter from running too large a load and also keeps the batteries from cycling unnecessarily. Set the *Stop Gen AC Amps* just below the start amps to make sure the large load has turned off. Set the start delay time so surge loads don't trigger a false start, and the stop delay time is long enough to ensure the load has turned off.

Amps Start/Stop Example: In this scenario, most AC loads typically do not exceed 20A when in Inverter mode. When a freezer or well pump starts, the load exceeds 30A so the battery voltage starts to quickly drop. Instead of cycling the batteries to a low voltage, set *Start Gen AC Amps* to *25A* with a *60-second* delay (using *Set Start Amps Delay* menu). Set the *Stop Gen AC Amps* menu to *20A* with a *60-second* delay (using *Set Stop Amps Delay* menu). After 60 seconds of detecting a larger than 25A load on the inverter, the generator autostarts and powers the loads and recharges the batteries. Once the AC amps load drops below 20A for 60 seconds, the gen turns off.

SETUP: 04D Gen Run SOC Menu

Info: This feature requires the optional ME-BMK (Battery Monitor Kit). Refer to your ME-BMK owner's manual to operate.

This menu starts and stops the generator based on the SOC (State of Charge) reading from the attached battery monitor, as shown on the METER button's *04A BMK SOC* display. This is the best method for using AGS settings to start/stop your generator. Since the ME-BMK already uses voltage, time, and current to determine the true SOC of the batteries, there is little guesswork or calculating needed to determine what settings to use.

- **Set Start Gen SOC** – This menu is used to set the SOC level for autostarting the generator.

  Default setting: *Set Start Gen SOC = OFF*

  Range: *OFF, 20% - 90%*

***Note[1]** – For a 4000 watt inverter, this would mean setting Start Gen AC Amps at 25A.*

- **Set Stop Gen SOC** – This menu is used to set the SOC level for autostopping the generator.

  Default setting: *Set Stop Gen SOC = 90%*

  Range: *21% - 100%*

Info: There is no start or stop delay time needed since the ME-BMK already displays an accurate state of charge of the batteries.

Where should I set Gen Run SOC? Most battery manufacturers recommend that for optimum battery life, deep-cycle batteries should not be discharged below 50% SOC. The ME-BMK determines the battery's SOC by using a DC shunt to measure the flow of current in and out of the battery. Many refer to a SOC meter as a "fuel gauge" for your batteries, since this meter gives you an accurate reading of how much capacity is remaining in the battery bank.

Set the *Start Gen SOC* level to *50%*, or to *60%* if you do not want to discharge the batteries quite as much. When considering the *Stop Gen SOC* setting, keep in mind that running the generator past 90% SOC delivers very little current to get that last 10% into the batteries. Thus, it is common to stop the generator at 90% to save fuel and run time on the generator. However, if the SOC stop setting is less than 100%, the batteries should be charged to 100% as often as possible (~ once per week, or every other discharge cycle) in order to avoid sulfation of the battery plates.

SETUP: 04E Gen Run Temp Menu

This menu allows you to set and enable a temperature value that will automatically start the generator — typically, to power an air conditioner unit for cooling — based on an increase in temperature, or by using an A/C thermostat control.

Info: The optional ME-PT1 or ME-PT2 pigtail adapters can be used to connect an A/C or relay control circuit. For more info, refer to the instruction sheet for each pigtail adapter (part number 64-0025 for ME-PT1 instructions, or 64-0026 for ME-PT2 instructions).

Info: This temperature autostart feature requires that the AGS's remote temp sensor cable (Figure 1-2) or an optional ME-PT1 or ME-PT2 pigtail adapter be connected to the AGS's REMOTE port (Figure 2-3). When using the remote temperature sensor, its location determines the area being monitored for temperature.

- **Set Gen Run Temp Start** – This menu is used to enable and set the temperature that triggers a generator autostart.

  65F - 95F (18C - 35C) – These settings determine the rising temperature value that triggers a generator temperature autostart.

  Ext Input – This setting is used when an optional pigtail adapter (ME-PT1, or ME-PT2) is used. When an AGS pigtail adapter is connected to the AGS's REMOTE port, an external command — either from a thermostat connection on an air conditioner control circuit or external relay control circuit — is recognized and causes the generator to start.

  Default setting: *Set Gen Run Temp Start = OFF*

  Range: *OFF, Ext Input, 65F - 95F or 18C - 35C (5 deg. increments)*

Info: If the temperature start feature is not needed, ensure this setting is set to the *OFF* position.

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- **Set Gen Run Temp Time** – This menu sets the amount of time the generator runs after a temperature autostart.

  Default setting: *Set Gen Run Temp Time = 2.0 Hrs*

  Range: *0.5 - 6.0 Hrs (0.5 hr increments)*

When the temperature around the remote temperature sensor (based on the *METER: 03D AGS Temp* display) increases to the *Gen Run Temp Start* setting, the generator immediately starts and runs based on the *Gen Run Temp Time* setting. When this run time period is finished, the temperature sensor reading is checked. If the temperature sensor (or thermostat control – if using the optional pigtail adapter) reading is below the *Gen Run Temp Start* setting, the generator will autostop. If the temperature sensor (or thermostat control) reading is above the *Gen Run Temp Start* setting, the generator will continue to run for a second run time period. At the end of this second run time period, the temperature sensor reading (or thermostat control) is checked again. This cycle continues as long as the *CTRL: 03 Gen Control* menu is set to *AUTO*, or the *SETUP: 04F Max Gen Run Time* setting is reached, whichever occurs first.

Why should I use Gen Run Temp? Typically, in a mobile application such as in an RV or on a boat where the air conditioning (A/C) unit is too much power for the inverter to run from the batteries, this feature is used to start a generator to run the A/C unit. Many RV and marine customers travel with pets and they do not want to leave the pets inside on a hot day. With this feature, you could set the A/C unit to turn on and leave. Whenever the inside temperature rises to the start setting, the generator autostarts to provide power to the A/C unit. This would keep the area cool and comfortable – plus, while the generator is on, the inverter batteries are being charged.

Where should I set Gen Run Temp Start? If you are using this feature to power an A/C unit, the *Gen Run Temp Start* setting should be slightly above the temperature setting of the thermostat controlling the air conditioner unit. Once the *Gen Run Temp Start* setting is reached, the generator will start providing power to the A/C unit. The reason the *Gen Run Temp Start* is set above the A/C unit's thermostat setting is to ensure the A/C unit will run when the generator starts. If the *Gen Run Temp Start* setting is below that of the A/C unit's thermostat setting, the generator will run but the A/C unit is not calling for a run period or cooling. In other words, your generator is running but the power is not being used by the A/C unit – resulting in wasted fuel and run time.

Info: If using the temperature autostart feature to start a generator that is powering two air conditioners, it is suggested that the second air conditioner's thermostat be set 2° to 5° higher than the first air conditioner. This staggered setting allows the first air conditioner to start and run in an effort to keep the coach cool. If the temperature continues to rise inside the coach, the second air conditioner turns on.

How long should I set the Gen Run Temp Time? When using the temperature autostart feature, the generator autostarts and runs until the *Gen Run Temp Time* setting or the *SETUP: 04F Max Gen Run Time* setting is reached, whichever occurs first. This means you could set the time to the lowest time setting (*0.5 Hrs*), knowing the generator will attempt to run until the temperature setting is met.

SETUP: 04F Max Gen Run Time Menu

This menu is used to set the maximum time the generator will run if the generator has been started by one of the AGS's autostart settings.

- **Set Max Gen Run Time** – Set the maximum amount of time you want the generator to run once it has been autostarted.

  Default setting: *Set Max Gen Run Time = 12.0 Hrs*

  Range: *0.0 - 25.0 Hrs (0.1 hr increments)*

Why should I use Max Gen Run Time? This setting is used to ensure the generator does not run longer than desired after an autostart. Designating a maximum run time ensures that the generator will stop if the autostop setting cannot be satisfied. For example, if you know the fuel capacity of your generator is 5 hours, set the *Max Gen Run Time* setting to *4.5 hours* to ensure the generator does not run out of fuel.

Info: When the generator autostarts from one of the autostart settings, it will autostop when the autostop parameter for that particular setting has been satisfied. For example, if the generator starts due to the *04A Gen Run VDC* menu's autostart setting, it then stops once it satisfies the *Stop Gen Volts* autostop setting. However, the *Max Gen Run Time* setting overrides <u>any</u> autostop setting. If the generator stops because the *Max Gen Run Time* setting has been reached, the *Fault MaxRun* status will occur. If this happens, you may have to increase the *Max Gen Run Time* setting or adjust the autostop setting to finish sooner. If multiple autostart settings are set in the *04 AGS Setup* menus and a *Fault MaxRun* status occurs, refer to the METER button's *03A AGS Status* menu to identify which condition autostarted the generator. This way you will know which auto condition is running longer than the *Max Gen Run Time* setting.

Info: The *Max Gen Run Time* menu uses the METER button's *03C Gen Run Time* display to determine the generator's run time.

Info: If the generator is stopped due to the *Max Gen Run Time* parameter being met, the status becomes *Fault MaxRn* and the generator will not autostart again until you clear the fault.

SETUP: 04G Quiet Time Menu

This menu is used to enable the Quiet Time feature, and to set the period of time each day in which the generator is not allowed to automatically run. The Quiet Time start setting will prevent the generator from starting even if one of the start parameters is met. If any autostart parameter in the *04 AGS Setup* menus has been met and the generator is running when the Quiet Time start setting is reached, the generator will turn off. The generator will not try to autostart until the Quiet Time stop setting has been reached and an autostart condition is once again satisfied.

The ME-ARC contains a real time clock that <u>must</u> be set for proper operation of the *SETUP: 04G Quiet Time Menu* feature.

- **Set Quiet Time** – Set to *ON* (allows you to set the start and stop times).

  Default setting: *Set Quiet Time = OFF*

  Range: *OFF, ON,* [daily start and stop time settings *(12:00AM-12:00PM)*]

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- **Set Start Quiet Hour** – Set the hour for Quiet Time to start.
- **Set Start Quiet Minute** – Set the minute for Quiet Time to start.
- **Set Start Quiet AM-PM** – Set AM or PM for the start of Quiet Time.
- **Set Stop Quiet Hour** – Set the hour for Quiet Time to stop.
- **Set Stop Quiet Minute** – Set the minute for Quiet Time to stop.
- **Set Stop Quiet AM-PM** – Set AM or PM for the stop of Quiet Time.

Why should I use Quiet Time? Quiet Time is used when there are park rules or local regulations that prevent generators from running (sleep hrs.). If there are no local rules or regulations, you may not want to use Quiet Time – which would allow the generator to run at any time in a 24-hour period.

Where should I set Quiet Time? Set the Quiet Time start and stop settings to coincide with local noise requirements, or for a specific time period that you do not want the generator to automatically run each day.

- **Set Quiet Time Topoff** – This menu sets the time the generator will autostart and run before Quiet Time starts. The generator will only start on *Quiet Time Topoff* if the battery voltage (or battery SOC[1]) start parameter is within a specified range.

  Default setting: *Set Quiet Time Topoff = OFF*

  Range: *OFF, 30 - 120 Minutes (30 min. increments)*

What is Quiet Time Topoff and why should I use it? The Topoff feature helps ensure the batteries have enough charge to last (i.e., prevent the inverter from shutting down from a low battery condition) through the entire Quiet Time period. When the Topoff feature is enabled by setting a time, the battery voltage (or battery SOC[1]) is monitored just before the start of Quiet Time; and if required, the generator will automatically start to charge the batteries.

This Quiet Time Topoff menu allows you to set a time at which the generator will autostart before Quiet Time starts. This applies whenever the start parameters are close to starting the generator at the start of Quiet Time. If the battery voltage is within 0.3 volts[2] or less of reaching the *04A Gen Run VDC* start parameter, the generator will autostart. The Quiet Time Topoff feature will also autostart the generator if the battery's SOC is within 4% or less of reaching the *04D Gen Run SOC* start parameter[1].

Scenario example (Topoff based on battery voltage): The *04A Gen Run VDC* menu is set to start at 11.5 VDC, Quiet Time is set to start at 10PM, and the *Quiet Time Topoff* setting is *60 min*. At 9PM, the battery voltage reaches 11.8 VDC; because the Quiet Time Topoff feature is enabled (60 min.), the generator autostarts to allow the batteries to charge for 60 minutes before Quiet Time turns the generator off.

Scenario example (Topoff based on battery SOC[1]): The *04D Gen Run SOC* menu is set to start at 60%, Quiet Time is set to start at 10PM, and the *Quiet Time Topoff* setting is *120 min*. At 8PM, the battery SOC reaches 64%; because the Quiet Time Topoff feature is enabled (120 min.), the generator autostarts to allow the batteries to charge for at least 120 min. before Quiet Time turns the generator off.

Note[1]: *Generator autostarting based on Quiet Time Topoff using battery SOC (State of Charge) parameters requires the optional Battery Monitor Kit (ME-BMK or ME-BMK-NS) to be installed and enabled.*

Note[2]: *This voltage is scaled depending on your battery system; ≤0.3 for 12-volt systems, ≤0.6 for 24-volt systems, and ≤1.2 for 48-volt systems.*

Where should I set Quiet Time Topoff? Normally, setting *Quiet Time Topoff* to 30 or 60 minutes is a good idea. In cases where the DC or inverter loads are unusually high or the SOC autostart setting is low — which may cause the batteries to be heavily discharged during the Quiet Time period — you may want to increase *Quiet Time Topoff* to 90 or 120 minutes; this ensures the batteries receive the maximum charge time before Quiet Time shuts the generator off.

Info: When the generator starts on Quiet Time Topoff, it will continue running until it reaches the Quiet Time start parameter even if the VDC or SOC autostop parameter is reached.

SETUP: 04H Gen Exercise Menu

This menu allows the generator to run (or "exercise") after it has not been operated for a period of time. The generator is automatically started at a pre-selected time whenever it exceeds a set number of days without running. Once the start command is initiated, the generator starts and runs to help it remain operational and to allow the generator's starting battery to be charged.

Info: The ME-RTR contains a real time clock that must be set for proper operation of the *SETUP: 04H Gen Exercise* menu feature.

- **Set Gen Exercise Days** – This menu sets the maximum number of days the generator is allowed to sit without running. If the generator has not run in this number of days, the exercise parameters will start the generator. The *Set Gen Exercise Days* setting must be between 1-250 days in order to enable the gen exercise feature.

  Default setting: *Set Gen Exercise Days = OFF*

  Range: *OFF, 1 - 250 Days*

  - **Set Exercise Run Hour** – Set the hour the generator will start.
  - **Set Exercise Run Minute** – Set the minute the generator will start.
  - **Set Exercise Run AM-PM** – Set AM-PM when the generator starts.
  - **Set Exercise Run Time** – Set how long the generator will run for the exercise period.

  Default setting: *Set Exercise Run Time = 1.0 Hrs*

  Range: *0.0 - 25.5 Hrs (0.1 hr increments)*

Why should I use Gen Exercise? Most generators are very dependable and will provide years of service if properly maintained and serviced. Exercising your generator is one of the most overlooked aspects of routine maintenance, yet its the simplest to perform. Regularly exercising your generator keeps engine seals and components lubricated, prevents oxidation of electrical contacts, uses up fuel before it deteriorates, heats up the generator windings to eliminate moisture buildup, helps ensure the generator's starting battery is maintained at an optimal state of charge, and in general, helps provide reliable engine starting. If long periods of time elapse without using your generator (remains connected to external AC power), or if you only use your generator a few days out of the year, enabling the Gen Exercise feature is recommended. However, if you run your generator frequently throughout the year, you may not need to use the Gen Exercise feature.

How often and how long should I exercise my generator? To maximize reliability and minimize repairs, it is important to exercise your generator at least once a month. This applies to both gas and diesel generators. When generators sit unused for as little as 30 days moisture can build up, and may

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damage your generator. Also, the fuel in gasoline-powered generators can begin to break down into gums and varnishes that clog the fuel system. Fuel varnishing results in hard starting and surging – a surging generator may not settle at a stable operating speed. Always check with your generator's manufacturer to determine how to properly exercise your generator. Generally, it is recommended that you run the generator every month for two hours under at least half the rated load. For example, with a 5,000 watt generator, turn on a load(s) that is about 2,500 watts, and let it run continuously for two hours. It is always best to run the generator for longer periods of time rather than for multiple short periods.

How does this Gen Exercise feature work? The Gen Exercise feature allows the generator to autostart at a pre-selected time whenever it has not run for a set number of days.

Once the Gen Exercise feature is enabled (by setting how many days to wait before exercising the gen under *Set Gen Exercise Days*), the generator will start and begin exercising only after two conditions are met. First, the generator must not have run for a set number of days (i.e., the Days Since Run timer value must be equal to or greater than the *Gen Exercise Days* setting). Second, the generator's exercise time of day (i.e., *Exercise Run Hour/Minute/AM-PM* settings) must occur.

Info: When the generator starts and runs based on the gen exercise criteria, the generator power passes thru the inverter to the inverter loads — if the inverter is enabled to accept AC power on its input — and also charges the inverter batteries (if the charger is enabled).

Info: The Gen Exercise feature identifies the number of days since the generator has last run by using the Days Since Run timer which is shown under the *METER: 03E Since Gen Run* display.

Example of a Gen Exercise Scenario:

Under *SETUP: 04H Gen Exercise Menu*, set to:

Set Gen Exercise Days = 3,
Set Gen Exercise Run Hour, *Minute* and *AM-PM = 8:30 A*,
Set Gen Exercise Run Time = 1.0 Hrs

Under *CTRL: 03 Gen Control,* set to *AUTO*.

First required condition: The Days Since Run timer must have accumulated to at least 3 days (*Set Gen Exercise Days = 3*). On Day 1, the generator was manually started and stopped at 2:00PM. The stop time (2:00 PM) is the starting point for the Days Since Run timer to begin counting days – the Days Since Run timer displays *0* days. On Day 2 at 2:00 PM, 24 hours have accumulated since the generator has last run – the Days Since Run timer displays *1* day. On Day 3 at 2:00 PM, 48 hours have accumulated since the generator last ran – the Days Since Run timer displays *2* days. On Day 4 (3rd day since the generator was manually started) at 2:00PM, 72 hours (or 3 days) have now accumulated since the generator has last run – the Days Since Run timer now displays *3* days. The first required condition — which is how many days must pass before the generator hasn't run — has been met.

Second required condition: The remote clock must now go to 8:30 AM (*Set Gen Exercise Run, Hour, Minute, and AM-PM = 8:30A*) before the generator can autostart. On Day 5 at 8:30AM (Days Since Run timer displays *3* days), the second required condition is met and the gen automatically starts and runs for 1 hour (*Set Gen Exercise Run Time = 1.0 Hrs*).

SETUP: 04I Gen Warm-up Time Menu

This menu allows the generator to run (i.e., warm up) before it connects to the inverter/charger, or powers the battery charger and any pass-thru loads. Most generators need to warm up before a load is supplied – similar to warming up your car before driving it.

- **Set Gen Warm-up Time** – This setting is the amount of time the generator is allowed to warm up before connecting to the inverter/charger.

  Default setting: *Set Gen Warm-up Time = 60 sec.*

  Range: *OFF, 1 - 120 Seconds, 3 - 127 Minutes*

Where should I set Gen Warm-up Time? Check with your generator manufacturer. Typically, smaller generators (~2-3 KW) need at least 60 seconds before applying a load; larger generators require a longer warm-up time.

SETUP: 04J Gen Cooldown Time

This menu allows the generator to continue to run after it disconnects from the inverter/charger and prior to autostopping (i.e., cool down). Allowing the generator to cool down after the load is disconnected helps to prolong generator engine life (especially diesel engines w/turbos).

- **Set Gen Cooldown Time** – This setting is the amount of time the generator is allowed to cool down after it disconnects from the inverter/charger.

  Default setting: *Set Gen Cooldown Time = 60 sec.*

  Range: *OFF, 0 - 120 Seconds, 3 - 127 Minutes*

Where should I set Gen Cooldown Time? Check with your generator manufacturer. Typically, smaller generators (~2-3 KW) need at least 60 seconds to cool down after being disconnected from a load; larger generators require a longer cooldown time.

Info: The warm-up and cooldown features prevent the generator from connecting to the inverter's AC input. Since the inverter only has a single-source input, it can not distinguish between grid or generator input. So, during warm-up or cooldown, the inverter will prevent any AC input from connecting. When either warm-up or cooldown is activated, it will disconnect any AC source connected to the inverter's AC input (i.e., grid or generator) until the time period (warm-up or cooldown) is over.

10.2 ME-AGS-N Functional Tests using the ME-RTR

Once you have used your ME-RTR router to establish all the autostart/autostop settings you need, perform the following tests to verify that the AGS system is functioning correctly and the communication from the remote/inverter to the ME-AGS-N is correct.

10.2.1 Router to Generator Communication Test

This section describes how to: access the AGS Home screen, determine the current AGS status, and use the ME-RTR router to start the generator.

10.2.1.1 Accessing the AGS Home Screen

In order to access the AGS's CTRL, METER, and PORT menus, you must first ensure that you are on the port that displays the AGS Home screen. Once the AGS Home screen displays, press the particular router button to access the desired AGS menu.

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To access the AGS Home screen:

1. Press and hold the METER button for 3 seconds. The System Home screen displays.
2. Rotate the SELECT knob to the port# to which the AGS is connected. This should be the AGS Home screen (*"AGS Home"* appears in the bottom right corner of the router screen).

10.2.1.2 Determining AGS Status

Use your router to determine the AGS's status by viewing the second line of the AGS Home screen.

Info: The AGS status can also be viewed by accessing the AGS Home screen, pressing the METER button, rotating the SELECT knob to the *03A AGS Status* menu, and then pressing the SELECT knob (second line is the AGS's current status).

The AGS's status should be *Off* or *Ready*. If it displays either status, then the remote/inverter is correctly communicating with the AGS. If the AGS status displayed is not *Off* or *Ready*, then refer to Section 12.2 "Resolving Operational Statuses" or Section 12.3 "ME-AGS-N Faults using your Remote" for assistance before continuing.

10.2.1.3 Starting the Generator from the Router

To confirm that the generator will turn on and run from the router, you must first ensure that the AGS status is "*Off*" or "*Ready*" (see Section 10.2.1.2).

From the AGS Home screen (see Section 10.2.1.1):

1. Press the CTRL button, and then turn the SELECT knob to the *03 Gen Control* menu.
2. Press the SELECT knob, and then rotate it to the *ON* setting.
3. Press the SELECT knob to turn on the generator.

Info: Once the generator starts, it should run until you change the *03 Gen Control* menu to "*Off*".

After two minutes, view the STATUS LED on the AGS module and ensure it turns solid green (a solid green STATUS LED means the generator has started successfully and is providing the gen run sense signal to the AGS module).

Note: If the generator attempted to start but did not run, continue to wait, the AGS will attempt to start the generator 3 more times.

If your AGS/gen system started (may attempt an autostart four times), ran, and the STATUS LED lit and stayed on (not blinking), then the wiring from the AGS to the generator is correct. You are now ready to enable the AGS by setting the *03 Gen Control* menu to "*AUTO*" in your remote (see Section 10.3.1).

Info: The AGS attempts to start the generator 4 times. If the generator fails to start after four attempts, the STATUS LED turns red – indicating a fault.

If the router displays a generator fault or the AGS module's STATUS LED shows a fault condition (solid red LED indication), refer to Section 6.2 "Generator Starting/Running Troubleshooting" for assistance.

10.3 ME-AGS-N Operation / Monitoring using ME-RTR

This section covers the menus under the ME-RTR's CTRL, METER, PORT and TECH buttons that determine how to control and operate the generator. The section also includes menus that are used to help monitor the AGS and the generator's starting and running conditions.

10.3.1 Controlling the AGS using the ME-RTR

The AGS uses the *CTRL: 03 Gen Control* menu to activate the generator either manually or automatically. From the AGS Home screen, press the CTRL button on the ME-RTR router and rotate the SELECT knob to the *03 Gen Control* menu.

CTRL: 03 Gen Control

This menu is used to manually turn the connected generator on and off, or to select the *AUTO* feature which enables the active generator autostart and autostop settings to control the connected generator. Available options are:

OFF: This selection turns the generator off if it is running from either a manual "on" command or an autostart command. When *OFF* is selected, the AGS is prevented from starting the generator automatically. This is the default setting.

Info: When "*OFF*" is selected, the AGS turns off immediately without any cooldown time (if set). However, if the generator is manually started from a generator control panel or a generator remote panel, selecting *OFF* may not shut down the generator.

Info: If DC power is lost to the remote or to the inverter system, this menu resets to the default *OFF* position for safety.

ON: This selection manually starts the generator by sending a "start" command from the AGS. Once the generator is started, it must be manually stopped, either from an external stop switch or by selecting *OFF* from the *03 Gen Control* menu, which sends a "stop" command from the AGS module.

Info: When "*ON*" is selected, the Magnum inverter will not attempt to accept the generator AC voltage until the warm-up period is satisfied.

Info: Manually start the generator and have it automatically stop by selecting *ON* from the *03 Gen Control* menu once the generator is running, and then changing the selection to *AUTO* to automatically stop the generator. When the generator has been manually started, and then the *AUTO* setting is selected, the AGS status displays as "*Start VDC*" and uses the autostop setting under the SETUP button's *04A Gen Run VDC* menu (even if not active) or the *04F Max Gen Run Time* menu, whichever occurs first. This manual on, auto off feature is useful if you want to make sure the generator starts before you leave.

AUTO: This selection uses the settings from the SETUP button's *04 AGS Setup* menus to automatically start and stop the generator. Refer to the *04 AGS Setup* menus in Section 10.1 to set the start and stop parameters for the generator.

10.3.2 Monitoring the AGS using the ME-RTR

The ME-RTR router has additional menus that are helpful for the proper operation and monitoring of your AGS system.

10.3.2.1 ME-RTR Router's AGS METER Button

From the AGS Home screen, press the router's METER button, and then rotate the SELECT knob to view the following read-only menus.

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METER: 03A AGS Status Menu

This read-only menu displays the AGS's current status. There are 26 different status messages to identify what state the AGS is currently in – only one displays at any one time (refer also to Figure 10-2).

Available statuses are (see Tables 11-1 thru 11-3 for information on each):

- AC In
- Gen Cooldown
- Gen Warm-up
- Manual Run
- No Comm
- Off
- Quiet Time
- Ready
- Start Amp
- Start Exercise
- Start SOC
- Start Temp
- Start Test
- Start Time
- Start Topoff
- Start VDC
- Gen Run Fault
- Fault Amp
- Fault Exercise
- Fault MaxRn
- Fault SOC
- Fault Temp
- Fault Test
- Fault Time
- Fault Topoff
- Fault VDC

Info: This menu is important when determining if the AGS is working correctly, or for troubleshooting an AGS installation. For any fault mode displayed in the status menu, refer to Section 12.0 in this manual.

METER: 03B DC Volts-AGS Menu

This read-only menu displays the DC voltage measured at Terminals #3 and #4 of the AGS module. This menu is useful in setting up the voltage start for the AGS, and for troubleshooting its operation.

Info: The DC voltage reading in this menu may vary from the DC voltage readings in the METER button's *01A DC Volts* and *04C DC Volts-BMK* menus. When troubleshooting, read the appropriate related meter for each device. When troubleshooting the AGS, use the *03B DC Volts-AGS* menu for verification and testing purposes.

METER: 03C Gen Run Time Menu

This read-only menu displays the length of time the generator has been running since it was autostarted by the AGS. This is useful when trying to determine how long the generator has been running since it was autostarted – in case you were not present when it started. This menu is enabled when the *CTRL: 03 Gen Control* menu is set to *AUTO*, but does not display run time when the generator has been manually started. Cooldown and warm-up times are not included in this gen run time display.

Info: The *Gen Run Time* menu's timer is started when the gen run sense voltage/signal is correct and qualified at the AGS module. It is not considered qualified until after a full start attempt and the *Gen Warm-up Time* setting is satisfied. Cooldown and warm-up times are not included in the gen run time display. Total generator run time = *Gen Run Time* + *Gen Warm-up Time* + *Gen Cooldown*.

Info: The times in this display are shown in tenths of an hour (0.0 hrs., 0.1 hrs., etc.,) – thus, 0.1 hrs. = 6 minutes.

Info: The Gen Run Time display resets to 0.0 each time the generator is autostopped. This meter is not designed to replace the hour meter for total hours the generator has run.

Info: This display is used by the *SETUP: 04F Max Gen Run Time* menu to determine the generator's maximum run time when started automatically.

METER: 03D AGS Temp Menu

The read-only menu displays the temperature of the AGS remote temperature sensor (included with AGS, but use is optional), and is helpful in determining its proper placement and operation. This temperature value can be displayed in either Fahrenheit (default setting) or Celsius.

Info: Use the *SETUP: 01E Temp Display* menu to change the temperature format, if required.

METER: 03E Since Gen Run (Days) Menu

This read-only menu displays the number of days since the generator has last run. This is useful in determining if the start and stop settings are set up correctly. This timer begins once the *CTRL: 03 Gen Control* menu is set to *AUTO*, and then counts by 1 for every 24-hour period the generator does not start. The Days Since Run timer resets any time the generator starts, which could be either by autostarting the generator (including from a previous exercise run), or manually starting the generator.

Info: When the DIP switch inside the AGS is set to "2-Wire Standby Mode", if you do not use the ME-RTR to manually turn the generator on, the Days Since Run timer will not be reset to zero.

10.3.2.2 ME-RTR Router's PORT Button

The router's PORT button provides you a way to access the AGS Home screen. The AGS Home screen displays the generator's current status, run time setting, DC stop voltage, temperature, and the router port number to which the AGS is connected. From the router's System Home screen (press and hold the METER button 3 seconds to access), continue to press the PORT button until the AGS Home screen displays.

10.3.2.3 ME-RTR Router's TECH Button

From the AGS Home screen (see Section 10.3.2.2), press the ME-RTR's TECH button, and then rotate the SELECT knob to access:

TECH: 01A INV AGS Temp Sensor

This menu displays the temperature of the area surrounding the remote temp sensor (temperature listed next to router port# in which sensor is connected). If the remote temp sensor is not installed, "*TS Open*" displays.

TECH: 02 Firmware Versions

This menu displays the software/firmware version of all the devices connected directly to the ports of the router (P1-P6). If an AGS is connected, the screen alternates the "AGS" display with the revision of the connected AGS.

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TECH: 03 Firmware Versions

This menu displays the software/firmware version of all the network devices connected directly to the network ports of the connected inverter. (P1acc-P6acc). If an AGS is connected, the screen alternates the "AGS" display with the revision of the connected AGS.

Info: The AGS accessory may display a "*0.0*" revision for several reasons. Either the AGS is not installed, there is no communication because of a bad or miswired network cable, or the AGS is not powered or is bad.

10.4 Enabling the ME-AGS-N using the ME-RTR

Before the AGS can begin operating and monitoring for an autostart condition (using the active AGS settings in your ME-RTR router), it must be enabled.

From the AGS Home screen (to access, refer to info in Section 10.2.1.1):

1. Press the CTRL button on the ME-RTR router, and then rotate the SELECT knob to the *03 Gen Control* menu.
2. Press the SELECT knob. The *Set Gen Control* screen displays with the current gen control setting and an arrow to the right.
3. Turn the SELECT knob to the *AUTO* setting.
4. Press the SELECT knob to select this setting. The selection arrow appears to the right of the screen

The AGS is now ready to automatically start/stop the generator once an autostart condition is satisfied.

Note: If power is lost to your remote, the AGS control setting will return to the default *OFF* setting. Once power is restored, you must enable the AGS again.

Note: Despite enabling the AGS, you must check the AGS's current status (either by viewing the AGS Home screen or under the *METER: 03A AGS Status* menu) and ensure the status displays as "*Ready*".

10.5 Starting and Stopping the Generator using the ME-RTR

Using the available settings from your ME-RTR router, the generator can be manually and automatically started/stopped.

To autostart / autostop the generator:

In order for the generator to autostart/autostop, one or more of the following autostart/autostop conditions must be pre-set (see Section 10.1):

Autostart Conditions

- 04A Gen Run VDC (pp. 62-64)
- 04B Gen Run Time (p. 65)
- 04C Gen Run Amps (pp. 65-66)
- 04D Gen Run SOC (pp. 66-67)
- 04E Gen Run Temp (pp. 67-68)
- 04G Quiet Time (pp. 69-71)
- 04H Gen Run Exercise (pp. 71-72)

Autostop Conditions

- 04A Gen Run VDC (pp. 62-64)
- 04B Gen Run Time (p. 65)
- 04C Gen Run Amps (pp. 65-66)
- 04D Gen Run SOC (pp. 66-67)
- 04E Gen Run Temp (pp. 67-68)
- 04F Max Gen Run Time (p. 69)
- 04G Quiet Time (pp. 69-71)
- 04H Gen Run Exercise (pp. 71-72)

To manually start the generator:

From the AGS Home screen (to access, refer to Section 10.2.1.1):

1. Press the CTRL button.
2. Turn the SELECT knob to the *03 Gen Control* menu.
3. Press the SELECT knob. The *Set Gen Control* menu displays with an arrow to the right of the current setting.
4. Turn the SELECT knob to the *ON* setting.
5. Press the SELECT knob to select the *ON* setting. The selection arrow appears to the right of the screen. The generator should start at this time.

If the generator does not start as expected, refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.

To manually stop the generator:

From the AGS Home screen (to access, refer to Section 10.2.1.1):

1. Press the CTRL button.
2. Turn the SELECT knob to the *03 Gen Control* menu.
3. Press the SELECT knob. The *Set Gen Control* menu displays with an arrow to the right of the current setting.
4. Turn the SELECT knob to the *OFF* setting.
5. Press the SELECT knob to select the *OFF* setting. The selection arrow appears to the right of the screen. The generator should stop at this time.

If the generator does not stop as expected, refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.

To manually start the generator and have it automatically stop:

From the AGS Home screen (to access, refer to Section 10.2.1.1):

1. Press the CTRL button.
2. Turn the SELECT knob to the *03 Gen Control* menu.
3. Press the SELECT knob. The *Set Gen Control* menu displays with an arrow to the right of the current setting.
4. Turn the SELECT knob to the *ON* setting.
5. Press the SELECT knob to select the *ON* setting. The selection arrow appears to the right of the screen. The generator should start at this time.

After the generator is running, rotate the SELECT knob to *AUTO* (under the *CTRL: 03 Gen Control* menu), and then press the SELECT knob to select the *AUTO* setting.

Note: When the generator is manually started, and then changed to autostop, the *SETUP: 04A Gen Run VDC* settings are used to determine when the generator will autostop. If the *SETUP: 04A Gen Run VDC* is set to *OFF*, the *Start/Stop Volts Delay* and *Stop Gen Volts* values that were entered prior to selecting *OFF* will still be used to autostop the generator.

If the generator does not start or stop as expected, refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.

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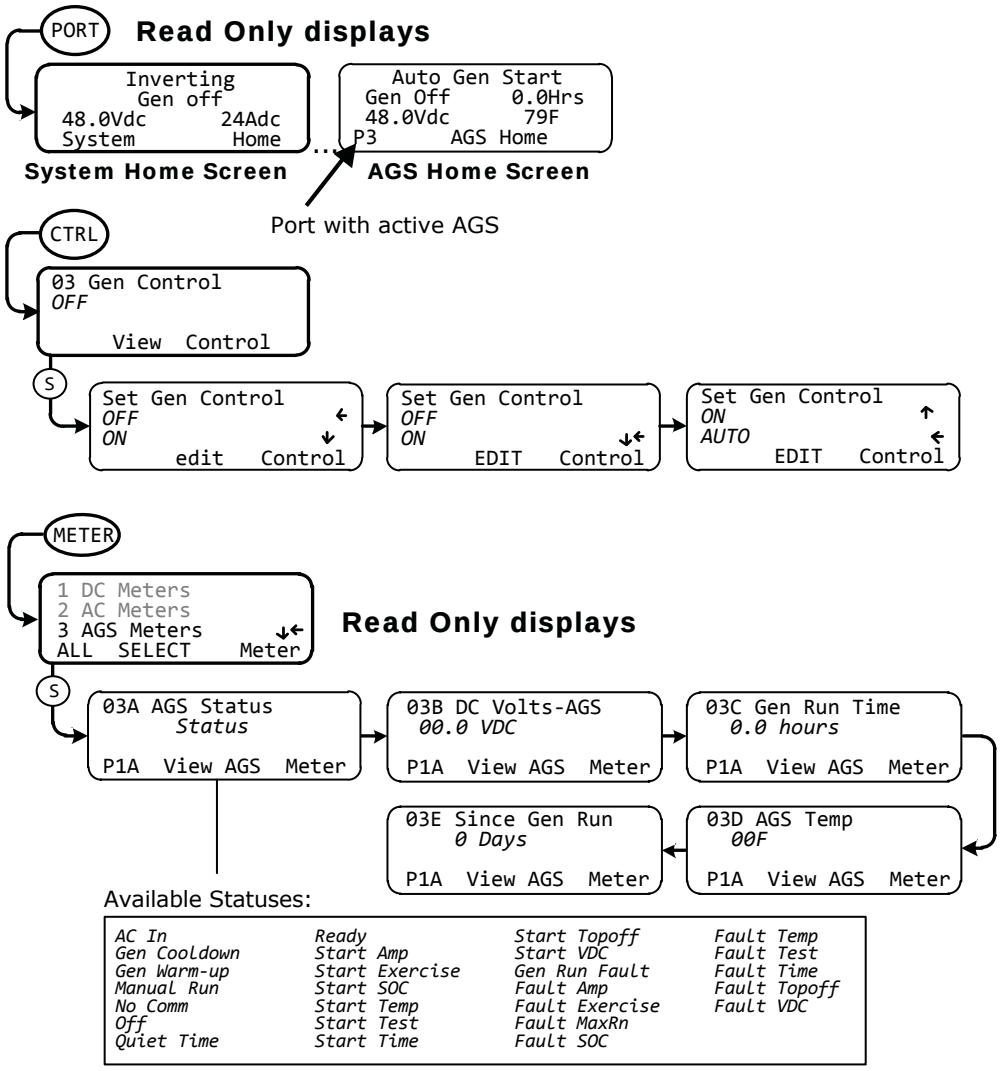
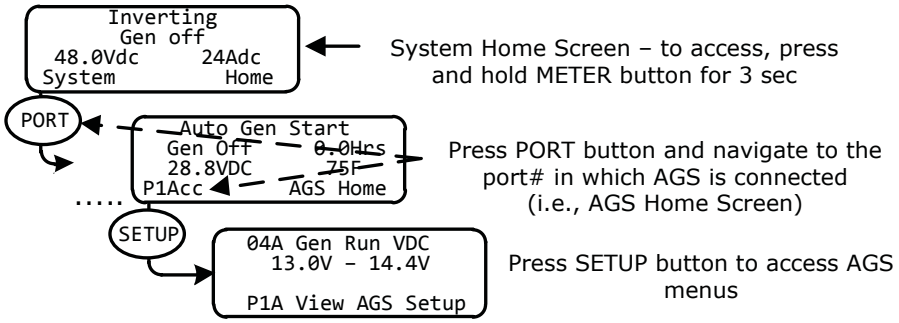
10.6 ME-AGS-N Menu Map using the ME-RTR

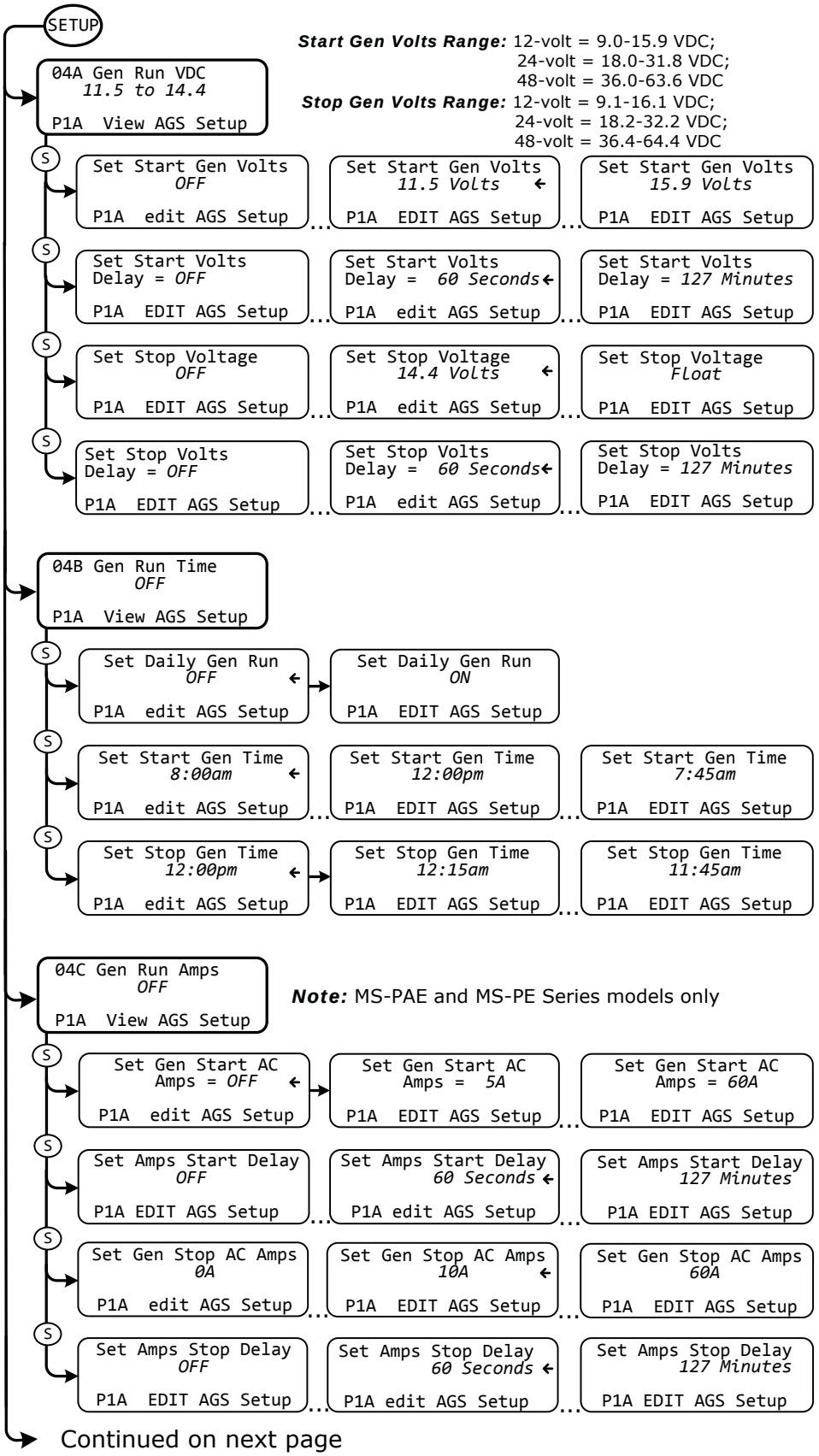


***Note*: The AGS-N SETUP menu is accessed via the System Home screen and PORT button. Refer to the procedures below to access these menu items.**



SETUP Button's AGS-N Menu Map starts on the top of the next page

Figure 10-2, AGS Menu Maps in ME-RTR Router (Section 1)



Continued on next page

Figure 10-3, AGS Menu Maps in ME-RTR Router (Section 2)

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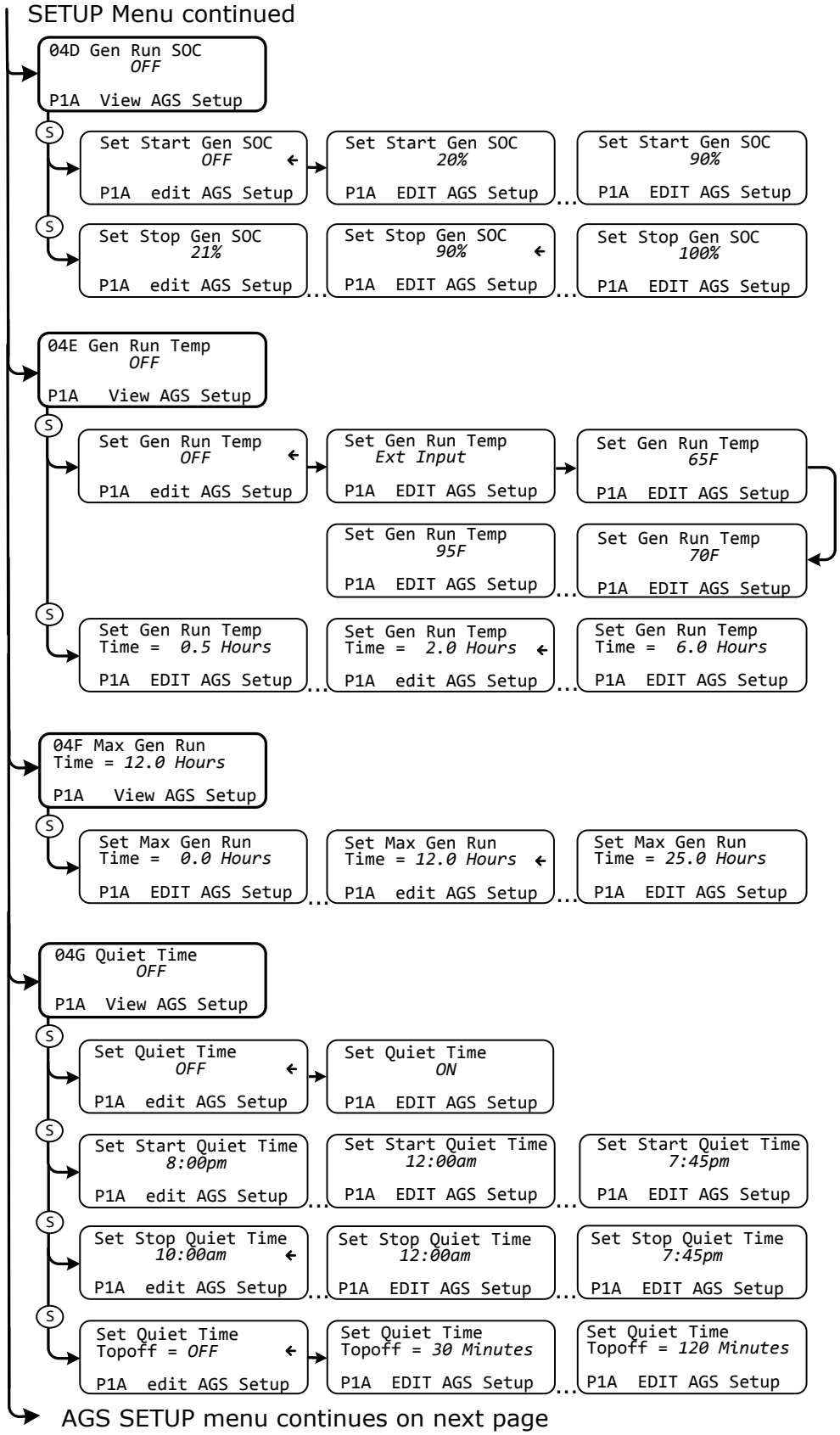
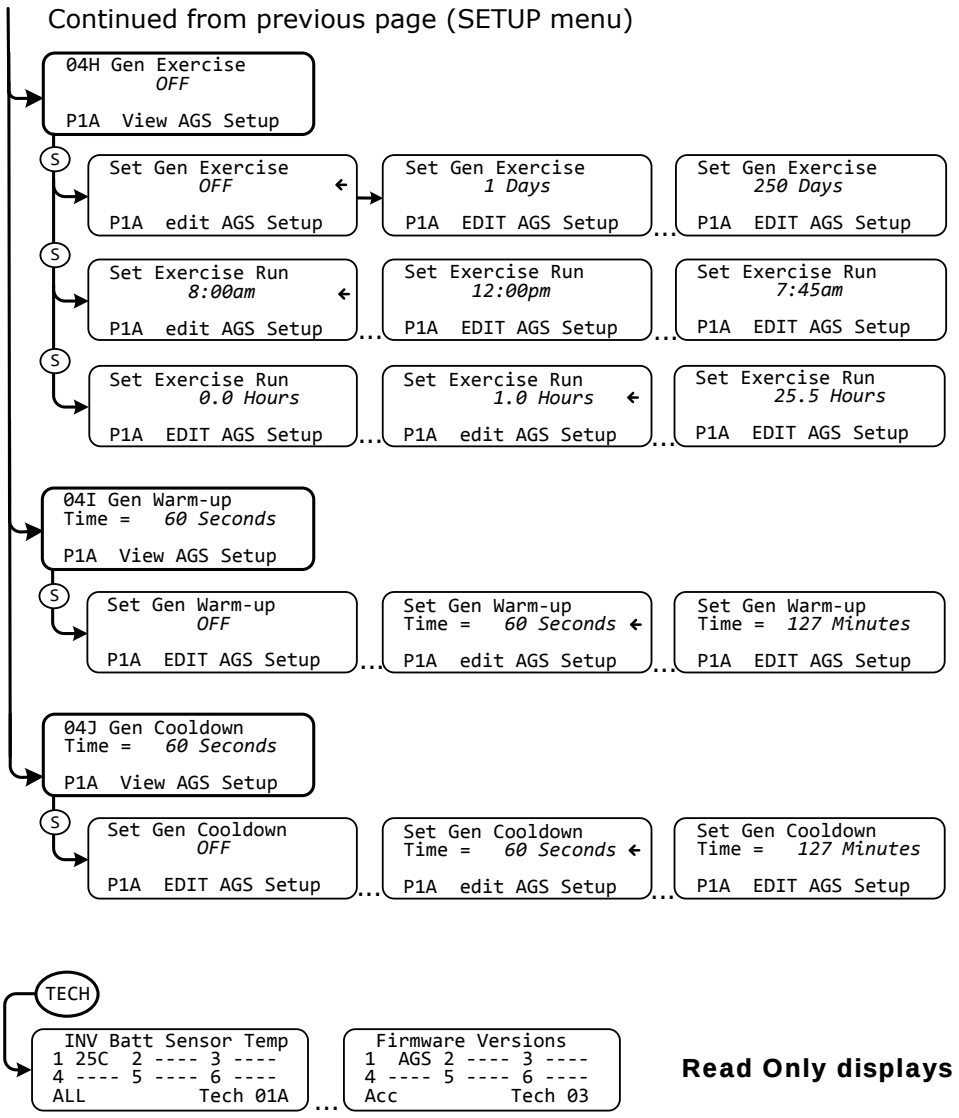


Figure 10-4, AGS Menu Maps in ME-RTR Router (Section 3)



** For this menu map, the arrow denotes the factory default settings

Figure 10-5, AGS Menu Maps in ME-RTR Router (Section 4)

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11.0 ME-AGS-N Remote Status Messages

A status message may be an operational or fault message. Access the AGS status menu (METER button's *03A AGS Status* menu for ME-ARC and ME-RTR; AGS button's *02 AGS Status* menu for ME-RC) to view the AGS's current operating status. This menu is important when determining if the AGS is working correctly, or for troubleshooting an AGS installation.

11.1 AGS Remote Operational Statuses

Refer to Table 11-1 for a brief description of the possible AGS operational statuses that may display (depending on your remote).

Note: RC = ME-RC, ARC = ME-ARC, and RTR = ME-RTR

Table 11-1, AGS Remote Operational Statuses

STATUS	REMOTE	DESCRIPTION
Ready	RC	The *AGS: 01 AGS Control* menu is set to *Enable* or to *Enable w/QT*, and the AGS is ready to automatically start the generator based on the AGS button's active autostart settings.
	ARC/RTR	The *CTRL: 03 Gen Control* menu is set to *AUTO*, and the AGS is ready to automatically start the generator based on the active autostart settings under the *SETUP: 04 AGS Setup* menu.
No Comm	RC/ARC/ RTR	The AGS is not communicating with the inverter/ remote. This is a normal status if there is no AGS (Network version) connected in the system. If an AGS is installed, then refer to Section 12.2 "Resolving Operational Statuses" for assistance.
AC In	RC/ARC/ RTR	The inverter/charger is connected to another source such as a grid or an alternate generator, and is not controlled by the AGS. When *AC In* displays, the AGS is prevented or locked out from all autostarting conditions, except for when the generator needs to exercise – if enabled.
Off	RC	The *AGS: 01 AGS Control* menu is set to *Off*. This setting will not allow the AGS to autostart the generator.
	ARC/RTR	The *CTRL: 03 Gen Control* menu is set to *OFF*. This setting will not allow the AGS to autostart the generator.
Gen Cooldown	ARC/RTR	The autostop setting has been satisfied in one of the generator autostart/autostop menus, and the generator has been disconnected from the inverter/charger. However, the generator is still running until the cooldown time is met (as per the *SETUP: 04J Gen Cooldown Time* setting).

Table 11-1, AGS Remote Operational Statuses (cont.)

STATUS	REMOTE	DESCRIPTION
Gen Warm-up	ARC/RTR	The AGS is attempting to start the generator and a time period has been set under the *SETUP: 04I Gen Warm-up Time* setting. Once the AGS status indicates "*Warm-up*", the inverter/charger's AC input ignores any incoming AC power. This prevents the inverter/charger from loading the generator during warm-up. Once the AGS has determined that the generator is running, the warm-up time setting must be met before the generator can connect to the inverter/charger.
Manual Run	RC	The generator was started manually from a start/stop switch directly connected to the generator, and the *AGS Mode* is set to *Other* (if the *AGS Mode=RV*, a Lockout fault displays instead).
	ARC/RTR	The generator was started manually from a start/stop switch directly connected to the generator, or from the *CTRL: 03 Gen Control* menu.
Note: The AGS determines that the generator has been manually turned on by sensing a gen run sense voltage to Terminal #2 on the AGS's 8-port terminal block. However, if the Gen Type DIP switch is set to "2-Wire Standby" — which does not require a gen run sense voltage — manually turning the generator on displays a status of *AC In* rather than *Manual Run*.		
Quiet Time	RC	The ME-AGS-N has entered Quiet Time per the AGS: 07 Quiet Time setting.
	ARC/RTR	The AGS has entered Quiet Time per the *SETUP: 04G Quiet Time* setting.
Note: The generator will not autostart during Quiet Time.		
Lockout	RC	Lockout occurs when the AGS system is automatically disabled because the generator has been started or stopped for any condition outside the control of the AGS. This an RVIA requirement, refer to the information on the AGS mode under the *AGS: 08 AGS TECH* menu on page 35.
Note: When a Lockout status occurs, the *AGS: 01 AGS Control* menu automatically changes from *Enable* (or *Enable w/QT*) to *Off*. For assistance in clearing or disabling this status, refer to Section 12.2 "Resolving Operational Statuses". ***Note:*** In installations where the requirement to automatically disable the AGS system is not needed, the AGS mode can be changed to "*Other*". Refer to the information on the AGS mode under the *AGS: 08 AGS TECH* menu on page 35.		

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11.2 AGS Remote Start Statuses

The following "Start" statuses identify the condition that autostarted the generator. If you determine that the autostart condition occurred sooner than expected (or didn't want this autostart condition), refer to the Setup section for your specific remote to change (or defeat) the autostart setting.

Table 11-2, AGS Remote Start Statuses

STATUS	REMOTE	DESCRIPTION
Start Amp	ARC/RTR	The generator has started based on the *SETUP: 04C Gen Run Amps* setting.
Start Exercise	ARC/RTR	The generator has started based on the *SETUP: 04H Gen Exercise* setting.
Start SOC	ARC/RTR	The generator has started based on the *SETUP: 04D Gen Run SOC* setting.
Start Temp	RC	The generator has started based on the *AGS: 04 Start Temp* setting.
	ARC/RTR	The generator has started based on the *SETUP: 04E Gen Run Temp* setting.
Start Test	RC/ARC/ RTR	The AGS is in Test mode. Test mode may be started from the TEST button located on the AGS,
	RC	or, by selecting *"Test"* from the *AGS: 01 AGS Control* menu (see Section 5.1 for further information on the AGS's TEST button).
Start Time	ARC/RTR	The generator has started based on the *SETUP: 04B Gen Run Time* setting.
Start Topoff	ARC/RTR	The generator has started based on the *SETUP: 04G Quiet Time Topoff Time* setting.
Start VDC	RC	The generator has started based on *AGS: 05 Start Volts* setting.
	ARC/RTR	The generator has started based on *SETUP: 04A Gen Run VDC* setting.

11.3 AGS Remote Fault Statuses

The following "Fault" statuses indicate that the generator wasn't able to start based on an expected autostart condition. Refer to Section 12.3 "ME-AGS-N Faults using your Remote" for help in diagnosing the problem.

Table 11-3, AGS Remote Fault Statuses

STATUS	REMOTE	DESCRIPTION
Gen Run Fault	ARC/RTR	The generator successfully started and ran for more than two minutes, but unexpectedly stopped before the AGS could automatically stop the generator.
Fault Amp	ARC/RTR	The generator failed to start in Start Amps mode.
Fault Exercise	ARC/RTR	The generator failed to start in Start Exercise mode.
Fault MaxRn	ARC/RTR	The generator turned off because the *SETUP: 04F Max Gen Run Time* setting had been met. This fault can occur when: 1) an autostop parameter has been met, but it did not stop the generator, or, 2) the autostop condition exceeded the *Max Gen Run Time* setting.
Fault SOC	ARC/RTR	The generator failed to start in Start SOC mode.
Fault Temp	RC/ARC/ RTR	The generator failed to start in Start Temp mode.
Fault Test	RC/ARC/ RTR	The generator failed to start in Test mode.
Fault Time	ARC/RTR	The generator failed to start in Start Time mode.
Fault Topoff	ARC/RTR	The generator failed to start in Start Topoff mode.
Fault VDC	RC/ARC/ RTR	The generator failed to start in Start VDC mode.

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11.4 General Notes

- If a fault condition occurs, either: select the *OFF* setting from the *03 Gen Control* menu (ME-ARC and ME-RTR controllers) and then select *ON*, or *AUTO*; or, from the *01 AGS Control* menu (ME-RC) select the *Off* setting, and then select *Enable* or *Test*. If the problem persists, refer to Section 12.0 "ME-AGS-N Remote Troubleshooting" in this manual.
- When the gen control setting in the remote is in the *OFF* position, all generator autostart functions are disabled and the AGS module's STATUS indicator will also be off.
- When AGS control is set to *Enabled* (ME-RC) or to *AUTO* (ME-ARC/RTR), and an autostart condition occurs, it attempts an automatic generator start. This is done by closing its internal relays (based on the Gen Type selection) to control the starter – much like a person does when manually starting the generator. The starter is turned on for short periods of time and then turned off. If the AGS determines that the engine has started while cranking (STATUS indicator lights solid green), the starter is turned off after a short delay. If the engine does not start, another attempt is made to turn on the starter after a long delay period. This is repeated until the generator starts or until all its start attempts are reached, which causes the AGS to go into a fault condition (indicated by a blinking FAULT indication on the remote and a solid red STATUS indicator on the AGS Module).
- If using the temperature autostart feature in an RV coach, set the air conditioner thermostat slightly less than the setting (*04 Start Temp F* menu – ME-RC; *04E Gen Run Temp* menu – ME-ARC and ME-RTR). If using two air conditioners, it is suggested that the second air conditioner thermostat be set 2° to 5° higher than the first air conditioner. This staggered setting will allow the first air conditioner to start and run in an effort to keep the coach cool. If the temperature continues to rise inside the coach, the second air conditioner will turn on to further cool the coach.
- When the generator starts successfully, the STATUS indicator on the AGS module will turn solid green. The generator will run until an autostop condition is reached or until it is manually turned off; at which time a stop signal will be sent to the generator.
- If the generator is running when the AGS module's TEST button is pressed (or the *Test* setting is selected from the *01 AGS Control* menu in the ME-RC remote), the generator will stop and then start again. The generator will then run for approximately 30-60 seconds before shutting off.
- When using a ME-RC remote, there is a two-minute delay before the AGS attempts to start the generator if the voltage to the AGS module falls to the *05 Start Volts* setting. When using a ME-ARC/ME-RTR remote, the delay is adjustable on volts and amps (*04A Gen Run VDC* and *04C Gen Run Amps* settings). There is no delay if the AGS attempts to start the generator when the temperature around the remote temp sensor rises to the ME-RC's *AGS: 04 Start Temp F* setting, or to the ME-ARC/ME-RTR's *04E Gen Run Temp Start* setting.
- Several autostart/autostop settings can be active at once. However, once an autostart condition becomes active, all other autostart conditions are ignored until the specific condition that caused the generator to start (e.g., *Start Gen AC Amps*) is satisfied by its autostop condition (e.g., *Stop Gen AC Amps*). Once the generator has completed this autostart/autostop cycle, the AGS immediately begins to monitor for any active autostart/autostop settings again.

12.0 ME-AGS-N Remote Troubleshooting

This section assists you in using your remote control to identify a fault, and to resolve an abnormal operational condition detected within your AGS system.

12.1 AGS Fault Message Screens for Magnum Remotes

When an AGS fault is detected, and the remote's FAULT LED comes on, the fault status is displayed on the LCD screen. Figures 12-1 an 12-2 are examples of how fault messages appear on each of Magnum's remotes. Use the remote's LCD screen and the information in this section to identify and correct the issue.

ME-RC and ME-ARC remotes – On earlier revisions of the ME-RC (<2.612) and ME-ARC (<2.3), look under the AGS status menu to determine the fault. In later revisions of each (RC ≥2.612; ARC ≥2.3), the FAULT LED blinks and the fault alternates with the inverter/charger status. See Figure 12-1.

ME-RTR router – The FAULT LED lights solid red if the RTR's display is on the port/device with the active fault, but flashes red if a different port/device has the active fault. Navigate to the port/device with the active fault – the FAULT LED turns solid red when you are on the correct port/device. See Figure 12-2.

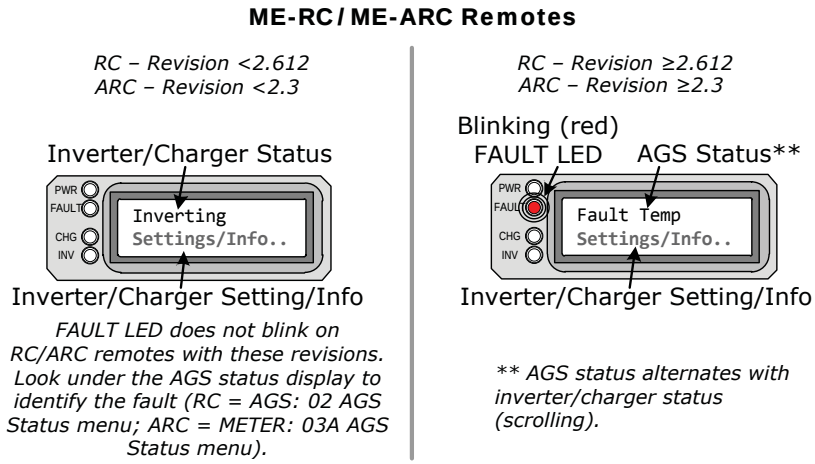

Figure 12-1 ME-AGS-N Fault Message - RC and ARC Screens

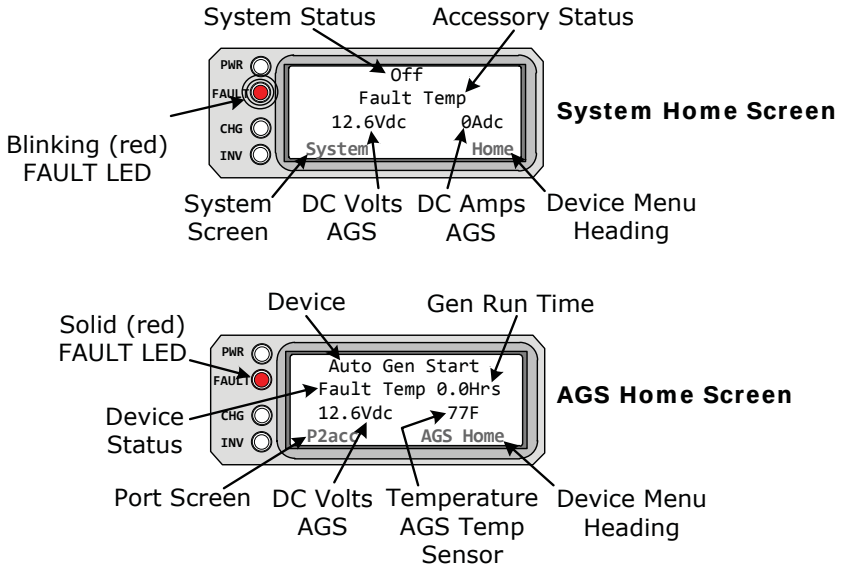

Figure 12-2 ME-AGS-N Fault Message - Router Screens

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12.2 Resolving Operational Statuses

The following operational statuses can display on your remote control, and some may indicate an abnormal condition. This section provides additional information and assistance to resolve these statuses (if needed).

- **No Comm** – This is a normal status if there is no AGS installed. If an AGS is installed, use the information below to determine the remedy.

Remedy: If an AGS is installed, then follow these steps:

1. Ensure the green READY indicator on the AGS module is on (blinking or solid) to indicate that the AGS module is getting power (see Figure 5-1).
2. Ensure the communications cable is connected from the Network port on the Magnum inverter to the NETWORK port on the ME-AGS-N (see Figures 2-5 and 2-6).
3. Ensure you have the correct communications cable (see Figure 2-4).

- **AC In** – This is a normal status when the input to the inverter/charger is connected to an AC source such as utility/grid power, or to an alternate generator that may not be controlled by the AGS.

Remedy: The *AC In* status prevents the AGS from autostarting. To enable the AGS to autostart the generator, remove any AC power connected to the input of the inverter/charger.

- **Lockout** – This is a normal status (ME-RC only) whenever the AGS is configured to comply with RVIA requirements (for use in an RV). This status displays whenever the generator is started or stopped for any condition outside the control of the AGS. To clear or disable the *Lockout* status, refer to the remedies below.

Remedy: To clear a *Lockout* status: Ensure the generator is off. On the ME-RC, go to the *AGS: 01 AGS Control* menu (the current setting should be *AGS = Off*) and press the SELECT knob to re-enter the "*Off*" selection. Once you re-select the *Off* setting, the *Lockout* status will clear (now should read "*Off*"). You must re-enable the AGS for autostart operation by changing the AGS control from *AGS = Off* to *AGS = Enable,* or *AGS= Enable w/QT* (under the *AGS: 01 AGS Control* menu).

Remedy: To disable the *Lockout* feature: If the AGS in not used in an RV installation (or you do not need to comply with RVIA requirements), you can disable the *Lockout* feature. Under the *AGS: 08 AGS TECH* menu, access the *AGS Mode* setting and change it from *RV* to *Other* (*AGS Mode = Other*). For more information on this setting, refer to the AGS mode under the *AGS: 08 AGS TECH* menu on page 35.

12.3 ME-AGS-N Faults using your Remote

For the eight faults that follow, refer to the Remedy immediately following the list.

- **Fault Temp** – The generator failed to autostart and run per the *04 Start Temp F* menu's (ME-RC) or the *04E Gen Run Temp* menu's (ME-ARC and ME-RTR) start parameters.

- **Fault Test** – The generator failed to autostart and run after "*Test*" is selected under the *AGS: 01 AGS Control* menu in the ME-RC, or the red TEST button is pressed on the AGS module (using any remote).

  Note: The ME-ARC and ME-RTR do not provide a "test" selection, instead they can be set to manually turn the generator on and off, which can be used to test the generator wiring to the AGS.
- **Fault VDC** – The generator failed to autostart and run per the *05 Start Volts* (ME-RC) or the *04A Gen Run VDC* (ME-ARC & ME-RTR) menu's start parameters.
- **Fault Amp** – The generator failed to autostart and run per the *04C Gen Run Amps* (ME-ARC & ME-RTR only) menu's start parameters.
- **Fault Exercise** – The generator failed to autostart and run per the *04H Gen Exercise* (ME-ARC & ME-RTR only) menu's start parameters.
- **Fault SOC** – The generator failed to autostart and run per the *04D Gen Run SOC* (ME-ARC & ME-RTR only) menu's start parameters.
- **Fault Time** – The generator failed to autostart and run per the *04B Gen Run Time* (ME-ARC & ME-RTR only) menu's start parameters.
- **Fault Topoff** – The generator failed to autostart and run per the *04G Quiet Time Topoff* (ME-ARC and ME-RTR only) start parameters.

Remedy: One of the above fault messages may display on the remote control when:

A. The AGS attempts to start the generator four times, but the gen failed to start and run per the specific autostart parameters; or,

B. The generator started, but did not provide the correct gen run sense signal to the AGS module. For either scenario, refer to Section 6.2 to troubleshoot why the generator does not start or run.

- **Fault MaxRn** – The generator has turned off because the gen run time — after autostarting — has exceeded the *SETUP: 04F Max Gen Run Time* setting (ME-ARC and ME-RTR only).

Info: The *Max Gen Run Time* menu uses the *SETUP: 04B Gen Run Time* display to determine the generator's run time. Cooldown and warm-up times are not included in the *Gen Run Time* display.

Remedy: Confirm that all the autostop parameters that are active or enabled can be satisfied before the *SETUP: 04F Max Gen Run Time* setting is reached.

- If using the *SETUP: 04A Gen Run VDC* menu's parameters:

  – with a battery voltage setting to autostop, ensure the autostop voltage is less than the temperature-compensated absorb charge voltage.

  – with the "*Float*" setting to autostop, ensure the time that the charger is in the Bulk Charge and Absorb Charge[1] stages is shorter than the *04F Max Gen Run Time* setting.

  Refer to your remote's *SETUP: 04A Gen Run VDC* section for additional information on this setting.

  Note[1]: *Several conditions determine the length of time that the charger is in the Absorb Charge stage. Ensure the SETUP: 03E Absorb Done (Time, Amps, or SOC) setting — determines when the Absorb Charge stage is complete and enters the Float stage — is taken into account when setting the 04F Max Gen Run Time setting.*

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- If using *SETUP: 04B Gen Run Time*, confirm you have not set the total run time (start time to the stop time) longer than the *SETUP: 04F Max Gen Run Time* setting.
- If using *SETUP: 04C Gen Run Amps*, confirm the inverter load(s) that is used to determine the *Stop Gen AC Amps* setting is not required to run longer than the *SETUP: 04F Max Gen Run Time* setting.
- If using *SETUP: 04D Gen Run SOC*, confirm that the *METER: 04A BMK SOC* reading is not "*Think'n*", but shows an actual percentage reading on the display (i.e., *85%*), and the *Stop Gen SOC* setting can be satisfied before the *SETUP: 04F Max Gen Run Time* setting is reached.
- If using *SETUP: 04E Gen Run Temp*, the temperature around the remote temperature sensor has not reached the *Gen Run Temp* setting. You need to either lower the *Gen Run Temp Start* setting, determine how to cool the area (remote temp sensor location) to below the *Gen Run Temp Start* setting before the *04F Max Gen Run Time* setting is reached, or increase the *Max Gen Run Time* setting.

Lastly, confirm that your warm-up and/or cooldown time when added to your autostop condition does not exceed the *SETUP: 04F Max Gen Run Time* setting.

Info: Beginning with Revision 5.2 of the ME-AGS-N, the *Max Gen Run Time* setting can be defeated. In some cases, it may be appropriate to set the *Max Gen Run Time* setting to *OFF*. However, this feature is mainly provided as a safety feature to ensure the generator doesn't run longer than the time it takes to reach the autostop conditions or to expend the generator's fuel capacity, whichever occurs first – take this into consideration if this setting is defeated.

- **Gen Run Fault** – The generator successfully started and ran for more than two minutes, but the generator unexpectedly stopped by itself before the active AGS autostop condition was finished.

Info: The AGS module determines the generator is running by monitoring the gen run sense voltage/signal. When this gen run sense voltage/signal is no longer available, the AGS thinks the gen is off or has stopped.

Info: Gen run fault detection is not active if the generator is manually started.

Remedy:

A) <u>If the generator is still running</u>: Confirm you are getting the correct gen run sense signal to the AGS module. For assistance, refer to Section 6.2 "Generator Starting/Running Troubleshooting".

B) <u>If the generator is not running</u>: Check the generator for fault codes and adequate fuel. If neither is an issue, check the generator's owner's manual for troubleshooting tips to determine why it may have shut down on its own.

12.3.1 How to Clear AGS Faults

- **ME-RC** – go to the *AGS: 01 AGS Control* menu and select *AGS= Off*.

  Note: After the fault clears and the reason for the fault is determined, be sure to re-enable the AGS to autostart. Go to the *AGS: 01 AGS Control* menu and select *AGS= Enable* or *AGS= Enable w/QT*. Refer to Figure 8-2.

- **ME-ARC and ME-RTR** – go to the *CTRL: 03 Gen Control* menu and select *OFF*.

  Note: After the fault clears and the reason for the fault is determined, be sure to re-enable the AGS to autostart. Go to the *CTRL: 03 Gen Control* menu and select *AUTO*. Refer to Figure 9-2 for the ME-ARC, and to Figure 10-2 for the ME-RTR.

Once the fault is cleared and the reason for the fault is determined, you should re-enable the AGS to see if the fault returns, or test the AGS/generator system by performing the AGS Functional Test for your remote (see Section 8.2 for a ME-RC; Section 9.2 for a ME-ARC; Section 10.2 for a ME-RTR).

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13.0 Appendix

13.1 Other Accessories and Equipment

Magnum offers a number of devices and accessories that can be used to expand and enhance your AGS and inverter/charger system.

13.1.1 Optional Accessories for the ME-AGS-N

AGS Pigtail Adapters

Magnum offers two pigtail adapters for use with the AGS. They are useful in applications that require you to automatically turn the generator on/off externally via a manually controlled switch, or from an automatically controlled switching device (i.e., using the A/C's thermostat controls to turn on the generator in order to run the A/C unit, or a relay control circuit):

- **ME-PT1** (pigtail one-wire) adapter is designed to allow the AGS to start the generator when an external +12-volt DC supply is applied.
- **ME-PT2** (pigtail 2-wire) adapter is designed to allow the AGS to start the generator by an external two-contact switch.

13.1.2 Additional Magnum Equipment / Accessories

The following devices are also available from Magnum Energy:

Battery Monitor

The Battery Monitor Kit (ME-BMK) is a single battery bank amp-hour meter that monitors the condition of the battery and provides information to let you know how much energy you have available. It also enables you to plan your electrical usage to ensure the battery is not being over-discharged.

MagWeb (device monitoring thru the internet)

The ME-MW-W (MagWeb Wireless) and the ME-MW-E (MagWeb Wired Ethernet) are tools for remotely monitoring Magnum inverters and accessories. The ME-MW-W connects to the Magnum network via a wireless data link and the ME-MW-E connects to the Magnum network via a wired Ethernet data link. They both provide live internet monitoring of the inverter, battery monitor, and the AGS. Using an "always on" internet connection, the MagWeb system makes live and historical conditions available using a web browser and Magnum's data transfer service.

MMP Series Enclosures

The MMP175-30D, MMP175-60S, MMP250-30D, and MMP250-60S enclosures are for single inverter applications. The MMP Series enclosures have been specifically designed to combine all of the major components required for a renewable energy system — inverter/battery disconnect, AC overcurrent protection, grounding connections and a full system inverter bypass switch as a convenient way to isolate the inverter for battery maintenance — into a single, easy to install pre-wired enclosure.

MP Series Enclosures

The MPSL, MPSH, MPDH enclosures have been specifically designed to combine MS-PAE inverters when configured for parallel operation. The MP enclosures feature convenient front-mounted AC and DC connections and easy panel operation using the optional ME-RTR router. Choose the MP model based on your power capacity needs. Each model is expandable. Start with the base model and just one inverter, and in the future add another inverter — up to four inverters total depending on your model — using the MPX expansion boxes.

14.0 Limited Warranty

Magnum Energy, Inc. warrants the ME-AGS-N (Automatic Generator Start - Network version) 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 this product extends for twelve (12) months beginning from the product's original date of purchase.

   Note: You can extend the normal one-year warranty on the ME-AGS-N to five years simply by ordering it with and installing it on one of Magnum's MP or MMP panel systems. To be eligible for the 5-year warranty extension, a proof-of-purchase is required at the time of repair/service showing that the ME-AGS-N and the MP or MMP panel system were purchased at the same time.
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, Magnum Energy will repair or replace at Magnum Energy's option, any defective parts or any parts that will not properly operate for their intended use with factory new or remanufactured replacement items if such repair or replacement is needed because of product malfunction or failure during normal usage. The limited warranty does not cover defects in appearance, cosmetic, decorative or structural parts, or any non-operative parts. Magnum Energy'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 for repair, determined by the price paid by the original purchaser. Magnum Energy shall not be liable for any other losses or damages.
4. Upon request from Magnum Energy, 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 Magnum Energy in Everett, WA. After the completion of service under this limited warranty, Magnum Energy will return the product prepaid to the original purchaser via a Magnum selected non-expedited surface freight within the contiguous United States and Canada; this excludes Alaska and Hawaii.
6. If Magnum repairs or replaces a product (with either a new or remanufactured 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 and parts removed from repaired products become the property of Magnum Energy.
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/operated according to the owner's manual

BEFORE RETURNING ANY UNIT, CONTACT MAGNUM ENERGY FOR A RETURN MATERIAL AUTHORIZATION (RMA) NUMBER.

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14.1 How to Receive Repair Service

If your product requires warranty service or repair, contact either:

1. An authorized service center, which are listed on the Magnum Energy website at http://www.magnumenergy.com/service/servicecenters-us.htm, or

2. Magnum Energy, Inc. at:

Telephone: 425-353-8833
Fax: 425-353-8390
Email: warranty@magnumenergy.com

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

- Return the unit in the original, or equivalent, shipping container.
- Receive a Return Materials Authorization (RMA) number from the factory prior to the return of the product to Magnum Energy for repair.
- Place 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 for shipment is not covered under warranty.** We recommend sending the product by traceable or insured service.

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PN: 64-0039 Rev. A ME-AGS-N