WARNING: The operator of the ARP Control is responsible for knowing the status of the control at all times, including the self-test functions. The ARP Control is designed to turn itself on if a power interruption occurs. A power interruption can be as simple as using the RV Master Power Switch to turn off power during storage of the RV. In this situation, when the power is restored to the RV, the ARP Control will turn itself on incase the operator forgets to check the control. The operator must perform the Test of ARP Relay described in this manual before each outing to confirm function of the ARP Control. Also, brown outs and transient on the RV 12VDC supply can turn off the ARP Control, these power interruptions are due to many factors which go beyond the scope of this document to describe. Due to brown outs and transients one needs to confirm that the ARP is functioning on a regular basis.

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By use of this document for installation and operation of the ARP Control (Fridge Defend®), the user is agreeing to the ARPC L.L.C. terms and conditions found in document ARPC LLC License Agreement.pdf. Also, the end user needs to understand that the ARP Control can be turned off at any time, thereby removing the ARP Control function and reverting to the operation of the refrigerator to its previous state. Also, the self-test functions which make the Fridge Defend an accessory safety control may be turned off by the end user; this will defeat the 24 hour self-test. Power surges can turn off the ARP Control just the same as any equipment in an RV, thus it is the operators responsibility to insure that the control is functioning properly. Any ARP Control that is believed to be malfunctioning, the ARP Control must be removed from operation and returned to ARPC L.L.C. for inspection immediately. Contact ARPC L.L.C. for shipping instructions. The reason for return must be included in writing with the returned control; shipping is the responsibility of the end user to and from ARPC L.L.C.

The document "ARPC LLC License Agreement.pdf" can be downloaded at web address http://www.ARPrv.com or, please send any request to e-mail address below, ARPC L.L.C. will supply information in a timely manner: ARPrvSafe@gmail.com

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Troubleshooting Guide
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INTRODUCTION
This Graphical Operation manual is ancillary to the 3 required ARP Control Manuals consisting of the Installation, User, and Troubleshooting Guides. The following Graphical User Instructions are yet another way to perform the same tasks outlined in both the Troubleshooting Manual and the online Video User Manual. Rather than using words and brief videos that describe each step, this set of User Instructions will graphically show each button push and the resulting display on the screen with a brief description and a reference to the respective ARP manuals which give further information about the function described. One must read and understand the aforesaid manuals.

BUTTON FUNCTION
The following terms are used in the text to indicate how to make changes to the ARP Control using the push buttons:

Momentary Press: This indicates that the operator depresses the button and then immediately releases in order to make a change.

Press and Hold: This indicates that the operator holds the button until a change occurs, once the change takes effect, release the button.

ON/OFF BUTTON – Turn On/Off ARP Control

Turn OFF ARP Control in All Modes

ARP BUTTON | ARP DISPLAY | FURTHER INFORMATION
--- | --- | ---
In addition to this guide, the User Guide and the Troubleshooting Guide tell the user how to turn OFF the ARP Control.

Please scan the respective manuals Table of Contents for the desired operation.

Further, there is a Video Operation Manual found online.

Please scan the online webpage Table of Contents for the desired operation.

TURN OFF CONTROL
Press and Hold On/Off Button for 6 seconds till display goes blank.

Release On/Off Button When display goes blank the control is off.
**Important Information for Setting Control Modes**

All control modes are entered by turning off the ARP Control first. To restate, use the above flow chart to turn off the ARP Control before attempting to enter one of the control modes. Next, use the following flow charts to restart the control in the desired ARP Control modes.

### Turn ON Control in ARP Control Mode

**ARP BUTTON**

**ARP DISPLAY**

**FURTHER INFORMATION**

In addition to this guide, the User Guide and the Troubleshooting Guide tell the user how to turn ON the ARP Control. Also see Control Modes.

Please scan the respective manuals Table of Contents for the desired operation.

Further, there is a Video Operation Manual found online.

Please scan the online webpage Table of Contents for the desired operation.

When in the ARP Control Mode, the single dot will flash to tell the operator the control is functioning.

### ARP or SP0 Mode Display Button Function

Once in the ARP Control mode the Display button reads the refrigerator parameters.

**ARP BUTTON**

**ARP DISPLAY**

**FURTHER INFORMATION**

The first value to be displayed is the fridge boiler temperature. Please remember that the boiler temperature varies between different cooling units. In addition the temperature will rise for about an hour then stabilize. When the heat is turned off the temperature drops for about an hour.
If the ARP is a fan control version, the next value to be displayed is the fan sensor temperature. If the sensor is below 35°F or above 155°F the display will read OA for out of range.

The last value displayed with the Display button is the fridge voltage. The reading shown is 13.7 volts. The fridge will not run if there is less than 10.5 volts.

When in SP0 troubleshooting mode this value checks the internal function of the controller.

This is the voltage MIN/MAX. Use this function to check the highest and lowest voltages on the system. The example shows typical system voltage with a solar charger cycling on and off. This is very handy for determining AC ripple on the electrical system.

ADD USER NOTES HERE:
ARP or SP0 Mode SetUp Button Function

Once in the ARP Control mode the SetUp button tests the control function and installation.

<table>
<thead>
<tr>
<th>ARP BUTTON</th>
<th>ARP DISPLAY</th>
<th>FURTHER INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>IMPORTANT TEST</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The first test checks the ARP installation and thereafter tests the controls ability to turn off the fridge. When <strong>OFF</strong> is displayed, go into the RV and check to make sure the fridge turns off. If <strong>E10</strong> displays, the ARP or the fridge is not wired correctly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This test checks the fans and wiring. When <strong>FAn</strong> is displayed the fans should turn on. The fans will turn off once test is ended.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This test checks the controller function and is automatic. When <strong>tSt</strong> followed by ******* is displayed the test is being preformed (*** See User Note**). When the test passes <strong>PAS</strong> is displayed. If <strong>F4</strong> or <strong>F5</strong> are displayed the test failed, contact ARP and provide the error that is displayed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>WARNING</strong>: Hold down the SetUp Button to exit the tests. There is no overheat protection when the tests are being preformed. <strong>Must see flashing dot on display for protection.</strong></td>
</tr>
</tbody>
</table>

* **USER NOTE**: The v5.0 control is made for economy and therefore does not have an audible alarm. For the v5.1, there is an audible alarm that informs the operator of conditions that require operator intervention. During this test, the v5.1 tests the audible alarm, because this test requires a person to hear the alarm, this is the only test of the audible alarm system. See Troubleshooting Guide for further information.
Turn ON Control in SP0 Mode

Before the SP0 mode can be started, the ARP Control must be turned off, see section above titled ON/OFF BUTTON – Turn On/Off ARP Control.

SP0 Mode Troubleshooting Button Function

Display Button: The Display button has added function for troubleshooting, see the ARP/SP0 Mode Display Button Function section for more information on troubleshooting with SP0 functions.

SetUp Button: The SetUp button has the same functions in the SP0 mode that are available in the ARP Control mode.
**Turn ON Control in Auto Tune Mode**

Before the **Auto Tune** mode can be started, the ARP Control must be turned off, see section above titled **ON/OFF BUTTON – Turn On/Off ARP Control.**

---

**USER NOTE:** It is imperative that when in the Auto Tune mode the procedures outlined in the Troubleshooting Guide are followed. It is critical that the Auto Tune be turned off using the On/Off button as described in the **Turn OFF ARP Control in All Modes** section. If these procedures are not followed, incorrect information may be stored within the control, resulting in errors that can lead to safety issues. If in doubt, have a qualified person follow these instructions.

---

ADD USER NOTES HERE:
Turn ON Control in SetUp Mode

Before the **SetUp** mode can be started, the ARP Control must be turned off, see section above titled **ON/OFF BUTTON – Turn On/Off ARP Control**.

**FURTHER INFORMATION**

About the only time SetUp will be needed is for reading of the stored variables for troubleshooting. Or, upon initial installation if your fridge is one of the refrigerators listed that require the PID mode the SetUp Mode will be needed for changing the setting.

In addition to this guide, the **User Guide** and the **Troubleshooting Guide** gives detailed information on how to use the SetUp Mode.

Please scan the respective manuals **Table of Contents** for the desired operation.

The first variable seen in the **SetUp** mode is ‘AtO’. The display will flash between the variable name ‘AtO’ and the ‘AtO’ value. Please see next section for navigating the **SetUp** Mode.

**Before Contacting ARP for Assistance**

Please record the first 7 values identified with the ‘☻’ symbol found in the **SetUp** Mode below before contacting ARP for help with any troubleshooting needs:

1. **AtO**: Tells operator or diagnostician which control mode.
2. **AtS**: Gives further info on control mode.
3. **AbS**: Maximum temperature boiler has reached.
4. **tr**: Number of times a trip or boiler overheat has occurred.
5. **OPn**: Number of times open circuit is recorded for boiler sensor purple/white wire.
6. **SHt**: Number of times short circuit is recorded for boiler sensor purple/white wire.
7. **SSH**: If the control is in the C-L or C-H mode, this value will be fixed as ‘-L0’. If the control is in the PID mode, this will record the maximum steady-state temperature.
SETUP MODE NAVIGATION

Button Operation

The three buttons on the ARP Control that performs the following functions when in the SetUp mode:

**On/Off Button**: Turn off the control by pressing and holding until **OFF** is displayed. One may turn off the ARP at anytime in the SetUp Mode without saving any changes.

**Display Button**: The display button is used to advance to the next SetUp variable. By repeated pushing of the display button the variables will advance to the store function (**S--**), and to the IEC errors recorded (**Er0**). The next press of the display button will rotate back to the first variable **AtO** to start the sequence over.

**SetUp Button**: The SetUp button will change the value of adjustable variables. Each push of the SetUp button will increment the value by +1 up to the maximum value, and then rotate back to zero depending on the variable.

Navigation Flow Diagram

**Note**: All initial values seen in this diagram are the default values in the **C-H** mode, your values may be different depending on the control mode or units of temperature display.
ARP BUTTON | ARP DISPLAY | FURTHER INFORMATION
---|---|---
Momentary press Display Button to advance to next variable | ![Image](image1.png) | This variable tells the operator how many times the ARP boiler sensor has detected a boiler over heat situation and shut down the fridge to protect the cooling unit. See Troubleshooting Guide for more information.

Momentary press SetUp Button to clear/zero the tr value | 003 | Set the tr value to zero and record the date to see when or how often the ARP turns off the fridge.

Momentary press Display Button to advance to next variable | ![Image](image2.png) | ! Be sure to advance to S-- and store the change.

Momentary press SetUp Button to clear/zero the OPn value | 005 | This variable records if the boiler sensor has an open circuit. See Troubleshooting Guide for more information.

Momentary press Display Button to advance to next variable | ![Image](image3.png) | ! Be sure to advance to S-- and store the change.

Momentary press SetUp Button to clear/zero the SHT value | 001 | This variable records if the boiler sensor has a short circuit. See Troubleshooting Guide for more information.

Momentary press Display Button to advance to next variable | ![Image](image4.png) | ! Be sure to advance to S-- and store the change.

Momentary press SetUp Button to clear/zero the SSH value | 183 | This variable records the boiler steady-state maximum temperature in PID mode. See Troubleshooting Guide for more information.

Momentary press Display Button to advance to next variable | ![Image](image5.png) | ! Be sure to advance to S-- and store the change.

When the SSH value has been cleared the display will show -LO.
<table>
<thead>
<tr>
<th>ARP BUTTON</th>
<th>ARP DISPLAY</th>
<th>FURTHER INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>FA 005</td>
<td>This variable is the setting at which the fan sensor turns on the fan. See Troubleshooting Guide for more information.</td>
</tr>
<tr>
<td></td>
<td>006</td>
<td>See table in FAn Setting section of Troubleshooting Guide for On/Off fan temperatures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>! Be sure to advance to S-- and store the change.</td>
</tr>
<tr>
<td>9</td>
<td>SP 005</td>
<td>This variable sets the steady-state ARP boiler sensor set-point. See Troubleshooting Guide for more information.</td>
</tr>
<tr>
<td></td>
<td>006</td>
<td>This setting rarely needs to be changed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This variable changes the overshoot set-point. This affects the PID function ‘AtS’ value. Or the C-L function ‘AtO’ value. Rarely used, see Troubleshooting Guide for more info.</td>
</tr>
<tr>
<td>10</td>
<td>05</td>
<td>This variable changes the displayed units of temperature for the boiler sensor between Fahrenheit and Celsius.</td>
</tr>
<tr>
<td></td>
<td>006</td>
<td>We recommend using C setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>! Be sure to advance to S-- and store the change.</td>
</tr>
<tr>
<td>11</td>
<td>C</td>
<td>This variable changes set-point function. C-H works on most fridges. See Troubleshooting Guide for more information.</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>C-L is used for the 3 cubic foot fridge.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pld is for 2013 on 1200/1210 series refrigerators and factory Norcold replacement cooling units, in addition the Norcold 2118 refrigerators. Also, Pld is required for the Amish cooling units. See Troubleshooting Guide for more information.</td>
</tr>
<tr>
<td>12</td>
<td>C-H</td>
<td>! Be sure to store changes with S--.</td>
</tr>
</tbody>
</table>
**ARP BUTTON** | **ARP DISPLAY** | **FURTHER INFORMATION**

13 | PER | **on** | When set to **on** the ARP periodic test is performed every 24 hours & the factory defrost cycle is defeated.

Momentary press SetUp Button to toggle setting between on and off

Be sure to store changes with S--.

14 | | **off** | When set to **off**, the ARP periodic test is not performed and the factory defrost cycle is run as scheduled by the manufacturer. See Troubleshooting Guide for further information.

Momentary press Display Button to advance to next variable

15 | Snt | OBS | This variable shows the version of software.

Momentary press Display Button to advance to next variable

16 | SnH | 535 | SnH stands for Serial Number hundreds. Example: The Serial Number would be 65,535.

Momentary press Display Button to advance to next variable

17 | BEP | **on** | When set to **on** the ARP will sound alarm when certain errors occur.

Momentary press SetUp Button to toggle setting between on and off

When set to **off**, the ARP will not sound alarm if fails IEC type tests. See Troubleshooting Guide for more information.

Be sure to store changes with S--.

18 | REC | | This variable resets the ARP Control to the default settings if Auto Tune was run accidentally. See Troubleshooting Guide for more information.

Momentary press Display Button to advance to next variable

When --- is seen, the settings have been restored.

Be sure to store changes with S--.
Momentary press Display Button to advance to next variable

Press SetUp Button to store settings. Keep an eye on the display, StO will flash, once StO flashes the button may be released.

When StO is seen, the settings have been saved to the control memory. The control can be turned off anytime while in SetUp, see Turn OFF ARP Control in All Modes.

Press SetUp Button to toggle through all recorded error messages.

This variable stores the errors that have occurred during the life of the ARP operation. These values cannot be cleared.

If there are no recorded errors, 0 will be displayed. The next press of the SetUp button will return the display to the Er0 variable name. Otherwise, if errors are recorded, use SetUp button to toggle through all errors recorded.

Example: If during the startup tests, or the periodic tests an IEC error is registered, the error will be recorded here. By using the SetUp button, each error that has been recorded will be displayed in a sequence. Write down the error that has been displayed for any communications with technical support. See Troubleshooting Guide for list of errors and their meaning.

It is always a good idea after making changes to go through the variables again to check the new settings.

Errors and/or Mistakes During SetUp Session

Mistake During SetUp Session?
Do you think a mistake was made during the SetUp session? No problem!
Just turn off the control as described above without performing a save procedure (S--).
Restated, the ARP Control was designed so that if the end user pushed the wrong buttons, no changes occur unless one saves the changes before turning off the control. Therefore, if in doubt, turn off the control and start over without saving changes.

**What if I Make a Mistake and Save?**

If things are going wrong and one thinks a mistake was stored during a SetUp session? Just use the Restore of Factory Settings (rEt) to set a base point to restart the ARP Control just as the control came the day you opened the package.

**How Do I Keep Track of Things?**

We recommend jotting down user notes when changes are made along with the date to keep a journal of refrigerator performance. The ARP Control is a powerful troubleshooting tool; therefore good notes help the end user solve problems. Also, if errors are noted, write down any corrective actions to resolve the issue so that one knows later what they have done. The ARP Control is designed to be setup once and then used, one cannot be expected to remember every setup step years later without notes.

**USER NOTES:**

| DATE | NOTES |
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Over the years of running a mobile RV repair service, having a dedicated place to access service manuals for all the different appliances and components found on RVs was something that I always had a desire to create.

I hope this resource makes your RV repairs easier, as it has mine, but please be careful and follow proper safety practices when attempting to repair your own RV.

If in doubt, please consult with a professional RV technician!

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