Fridge Defend® by ARP

v5.x ARP & ARP + Fan Control

General Install Guide

Installation/Operation Web Search Engine:

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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..

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How to Use This Manual

This installation manual is easy to use when taking the following into account:

This manual is universal, that is, this manual is for both Dometic and Norcold installs. Thus, there are many pages that may not be necessary for your particular installation based on make and model. For this reason, please use the **LIST of FIGURES** and the **TABLE of CONTENTS** to find information.

There is a **WIRING OVERVIEW** that gives a majority of the installation technical information for wiring. One can go to the **DOMETIC** or **NORCOLD WIRING GUIDE** for specific information on a particular fridge wiring scheme.

Once the install is complete, the **POST INSTALL** instructions must be used to test the control and determine if any special settings may need to be set.

Download all Manuals

All technical help from ARPC LLC will reference the respective manuals:

User Guide: Shows how the operator interface works and common usage.

Troubleshooting Guide: Gives details on how to make control settings, such as change fan setting or set into PID mode. Also, this is an extensive guide on how to use the Fridge Defend to trouble shoot your fridge, great information for free!

Ancillary Graphical User Instructions: This is a very handy guide that shows all button sequences in a flow chart. This is a complement to the verbiage in the Troubleshooting Guide.

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Norcold Web Resources

Please click following links while connected to the internet to go to webpage:

- Basic Wiring Video
- Temperature Sensor Install Video
- Fan & Sensor Install; Fan Settings Adjustment
- Detailed Wiring Information - Norcold
- Norcold → Dometic Cross Reference Charts

Dometic Web Resources

- Basic Wiring Video
- Left-Hand Boiler Sensor Video
- Right-Hand Boiler Sensor Video
- Fan & Sensor Install; Fan Settings Adjustment
- Detailed Wiring Information - Dometic
- Dometic → Norcold Cross Reference

Fan Install Web Resources

- Fan Set-Point Temperature Setting Video
- ARP + Fan Control Sensor and Fan Installation

Set-Point Function Web Resources

- Change to PID Set-Point Function Video

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SAFETY

1.1 Acronyms and Abbreviations

ARP: ARP Control = *Fridge Defend®*
GND: Ground
P/N: Part Number
RTD: ARP Control temperature sensor; Resistance Temperature Detector is the type of sensor used.

1.2 Hazard Information

Hazard information includes terms, symbols and instructions used in this manual or on the equipment to alert operating and service personnel to the recommended precautions in the care, use and handling of the ARP.

1.3 Work Safely

There are many ways to install the ARP. **Make safety your first priority**! The installer's knowledge, skill, and ability are important for safely installing the system. If you are unsure of your ability to do the installation, have a qualified installer do the work.

1.4 Terms & Warnings Symbols

DANGER	Imminent hazards which, if not avoided, will result in serious injury or death.
WARNING	Potential hazards which, if not avoided, could result in serious injury or death.
CAUTION	Potential hazards which, if not avoided, could result in minor or moderate injury.

1.5 Operation Safety

The ARP Control and 'ARPrvSafe' infer that the use and operation of this control can add a level of safety to the absorption refrigeration system in a RV. No other RV absorption refrigerator control monitors the boiler temperature and turns off the 12VDC to the refrigerator before damage may occur to the internal fluids in the refrigerator cooling unit. The ARP cannot prevent RV refrigerator failure if the manufacture built the cooling unit in a manner that would result in premature failure. It must also be emphasize that the ARP Control performs a different task than the manufactures recalls and does not replace any manufacture safety device.

1.6 ARP Control and your Refrigerator

The ARP Control is designed to work in conjunction with the manufactures safety devices that are presently on your RV refrigerator. Many of the manufactures over temperature devices have proven to turn off the refrigerator unnecessarily, rendering the refrigerator useless. Due to this common complaint, the ARP control can be turned off using the On/Off button. The end user does not need to fear a potential situation where the ARP Control keeps the refrigerator from performing its normal function. Thus, when the ARP Control is off, your refrigerator is still protected by the manufactures safety devices. It is the end user's responsibility to insure that the ARP Control is installed and functioning properly at all times, this includes the state of the control being turned on or off.

DANGER Never remove or bypass any manufacture safety device when installing the ARP Control. Be aware that the ARP Control can be turned off, or user settings changed in a manner that prevents/limits safety functions of the controller as an accessory device. Know and understand your RV electrical system and its integrity for proper ARP Control use. RV electrical systems integrity are complex due to the inclusion of charging systems such as solar systems, generator, inverters and 120VAC chargers just to mention a few sources of electrical disruption that can result in disruption of ARP Control function. Always consult a certified RV repair facility and/or the manufacture of your RV if you are concerned about safety issues.

INTRODUCTION

2.1 What is the ARP Control?

The ARP is a monitoring device for RV refrigerators. The ARP turns off your cooling unit heat source by turning off the 12VDC power to your refrigerator if the boiler overheats. The ARP Control will automatically attempt to restart your refrigerator five times. RV absorption refrigerators work by boiling a fluid mixture that includes water and ammonia. The ammonia turns into a gas that rises and separates from the water mixture. The ammonia then condenses into a liquid that flows through the cooling unit tubing. During this cycle the ammonia absorbs heat thereby cooling the refrigerator. RV refrigerators are notoriously unsafe when operated off-level or in a variety of temperature and pressure conditions.

If the boiler in your RV refrigerator overheats, the cooling tubes are stressed which may lead to early failure or even a rupture that could cause a fire. The ARP monitors the actual boiler temperature of your RV refrigerator to detect conditions that can be unsafe, and in turn, shut off the boiler heat source to prevent overheating. Please note that the ARP Control setup and adjustment including the Auto Tune function depend on proper function of your cooling unit at the time of the setup. The ARP Control cannot change the parameters of your cooling unit. If you have a failing, damaged, or poorly constructed cooling unit, the ARP Control cannot change this situation nor alter the physical properties within your cooling unit.

Following are general installation instructions for the ARP Control. Please check our website (https://www.arprv.com/installation-search.php) for specific refrigerator make and model installation information.

GENERAL INSTALLATION

3.1 System Components

The ARP is not complicated. The entire ARP kit is seen in Fig. 1a & b as an overview for the installation process. Most ARP customers install the control on their own if they have some electrical and mechanical skills. If you do not feel you understand the installation you can contact technical support or have a competent RV technician perform the task. Any RV technician that can replace a refrigerator, or that is certified, has the ability to install the ARP control due to the simplicity.

The boiler temperature sensor measures the temperature of the boiler tube. The controller looks at this information and is programmed to turn off the power to the fridge when an overheat situation occurs.

3.2 Supplies & Tools

Necessary supplies for the installation of the ARP:

- Dielectric Grease or Silicon Grease (CAMCO **Electrical Protectant & Lube**; Walmart or NAPA Auto Parts 'Sil-Glyde').
- Super Glue.
- Fiber glass insulation without backing.

Optional Supplies for the Installation of the ARP:

- Cable Clamps (Ace Hardware P/N: **PPC-1525**; Radio Shack P/N: **640-3039**).
- Optional clips for RTD attachment (ACE Hardware -- Hilman Hardware **58410**).
- Metal Repair Tape (ACE Hardware P/N: **47523**).
- Hose Clamp to attach the ARP + Fan Control temperature sensor to cooling unit tubing, see Fig. 25.
- Relay (clamped coil type only) for either alarm, high current application (>5A), manual type control, or small gauge wire indoor install (Tyco P/N: **0-1432793-1**).

WIRING OVERVIEW

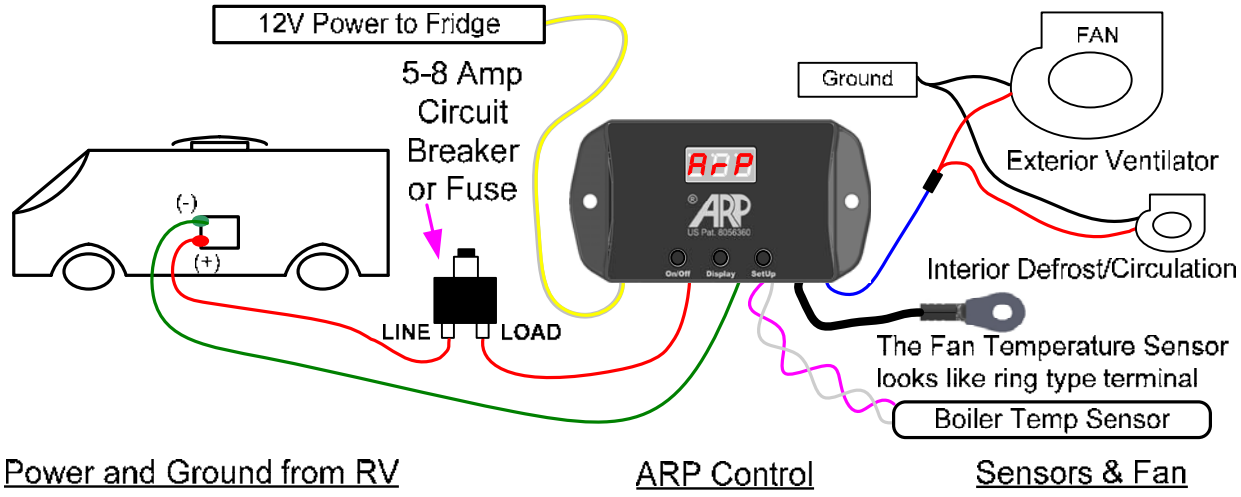


Fig. 1a – ARP + Optional Fan Control Kit with General Wiring

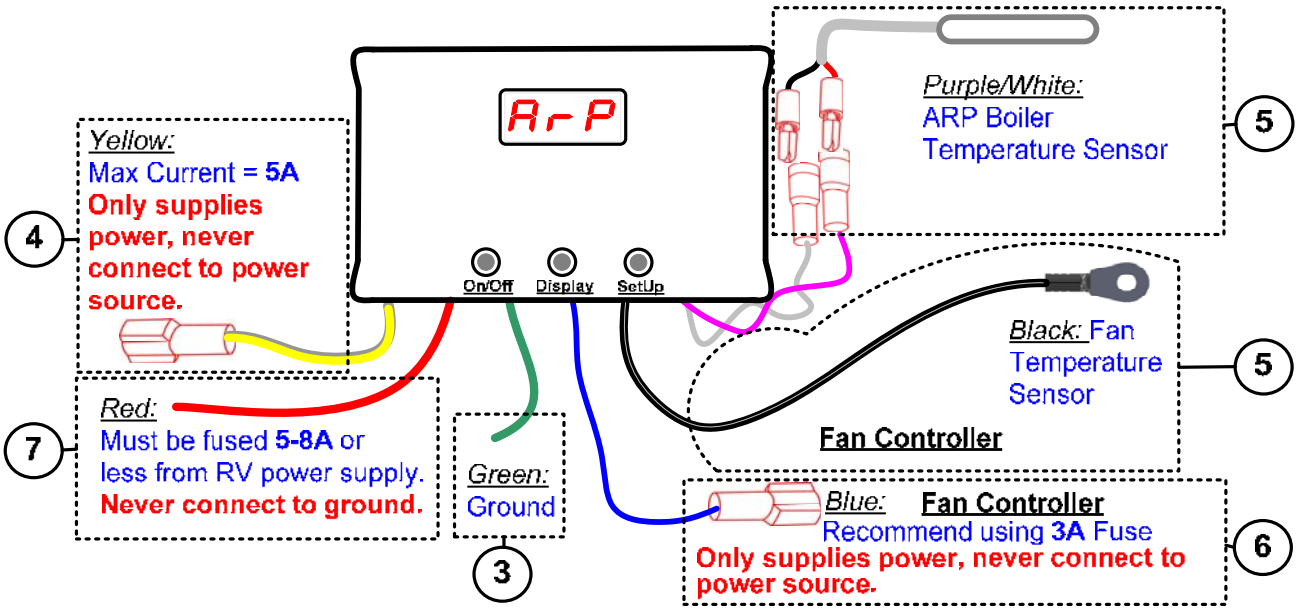


Fig. 1b – Wiring Overview, Sequence & Amperage Specifications

Fig. 1a shows how the ARP is connected to the vehicle battery and shows the connections to the fridge and sensors. Fig. 1b shows the wiring sequence with proper type of supplied connectors and amperage cautions. Fig. 1b wiring install sequence numbers within circle matches Table 1 Install Sequence number, only wire in this order.

Install Sequence/Steps	What?	Overview	How
1	RV Power	Turn Off Power to Fridge, then Remove Fuse	Find wire that supplies power from RV battery to factory fridge control, disconnect. Test, fridge will not turn on, power is off (section 6.1). Remove fridge fuse (should be 5-8 amps, if not use 5-8A inline fuse on ARP red wire).
2	ARP Control	Mount Fridge Defend	Find appropriate location and secure controller (section 5.1).
3	**Ground**	Connect ARP to	Identify Ground (section 6.2) and connect ARP **Green Wire**.

		Ground	
4	ARP Power **Out**	Connect ARP Power Out to Fridge	Connect the ARP **Yellow Wire** to the factory fridge control at location where power was disconnected in step 1.
5	Sensors	Install and Wire Sensors	Install and connect boiler sensor (section 4.1) and fan sensor (section 10.1) if applicable. Only the boiler sensor shall be connected to the **Purple**/**White** pair.
6	ARP Fan Control	ARP Fan Controller Only.	Mount fans (section 10.2), connect fan black wire to ground and fan red wire to ARP **Blue Wire**. Run defrost fan positive wire through drip tube, ground fan to interior light ground (section 10.3).
7	ARP Power **In**	ARP Power Supply Input	Connect ARP **Red Wire** to the wire disconnected from the factory fringe control in step 1. Reinstall fuse removed in step 1.
8	TEST	TEST INSTALLATION	See Sections 12.1 & 12.2 for post install test and setup.

Table 1 – Wire Sequence & Identification

WARRANTY INFORMATION

The ARP Control is tested with a 3 amp load before shipment. The ARP Control v5.x can handle up to 8 amps of load, thus a 5-8 amp fuse or circuit breaker is required on the ARP Control red wire. A short to ground is considered an infinite load, thus a short to ground exceeds the ARP current rating. Exceeding **Fig. 1b Amperage & Grounding Specifications** or incorrect wiring connections will void the ARP Control warranty. The ARP is not designed for a direct short, a direct short will damage the ARP relay and this is why one needs to make sure of all wiring connections before restoring power to the ARP Control.

INSTALLATION – ARP BOILER SENSOR

4.1 Instructions for Mounting the Temperature Sensor

Overview

The temperature sensor (RTD) clips onto the boiler tube. Figures 3 thru 4 show cutaway views of typical boiler assemblies with the ARP temperature sensor. The temperature sensor clip will be super glued to the sensor for installation. Then the temperature sensor must be insulated so neither the electric heaters nor the flue tube heat the sensor. The whole idea is to mount the temperature sensor so that it only picks up heat from the boiler tube, thus insulation is critical.

Please see sections 4.2 and 4.3 for Dometic and Norcold sensor install only after reading through the enumerated steps and before installing the sensor.

⚠ **CAUTION** Do not mount the RTD on the red flue tube as seen in Figures 3 thru 4. This will damage the boiler temperature sensor by overheating. Overheat damage will void the warranty for the sensor. The installer must determine the proper tube to mount the sensor. Please contact technical support if you have any questions.

Enumerated Steps

1. Open the access door to expose the rear of the refrigerator.

2a. For refrigerators that have metal boiler housings, open the heater access door as seen in Fig. 4b. To open the door, there is a tab that fits into the slot seen in Fig. 4b. Straighten the tab and open the door. Once the door clears the heaters, push the door up to unlock the lower hinge. Now the door can be removed. Please see our website resources for more information.

2b. For refrigerators that have foil boiler housing, such as the Norcold 1200, pull out the section of insulation inserted with the Norcold recall. Please reference the following 2 web documents:

Norcold Recall Installation Document

ARP Installation Search Engine

3. Push the insulation aside so you can identify the various tubes. Sections of insulation may also be removed to gain access to the tubing inside.

4. Be sure to mount the sensor to the boiler tube. This tube is most easily identified by the fact that the electrical heater holders are welded directly to the boiler tube. It is up to the installer to confirm the correct tube. As a rule of thumb, but not always, Dometic cooling units generally have the boiler tube behind the flue tube and Norcold boiler tubes are in front of the flue tube as seen looking into the cooling unit compartment door. In the following drawings the flue tube is red for identification.

5. Referencing Figures 3 thru 4, the RTD and clip are shown, where the RTD has been super glued to the clip for ease of installation. Note that the alignment of the clip depends on the boiler tube arrangement for the particular boiler assembly, see RTD and clip next to boiler assembly in Figures 3 thru 4. Also note that the wires exiting the RTD housing are aligned away from the center of the clip so that insulation can be placed between the boiler process tube and the RTD wires as seen in Fig. 2.

If the clip is glued in the wrong position, use Acetone to release the supper glue. Do not get Acetone on the wire end of the RTD.

6. Determine the position of the RTD so that it meets the following criteria:

- The sensor tip is touching the boiler process tube.
- The sensor is mounted away from the flue tube.
- The sensor is a least 1” above the electric heating elements, anywhere in the range of 1" to 3" above heating elements.

The maximum sensor height is below the 2nd from top absorber coil as seen in Fig. 3a.

Fig. 3a and b show typical Dometic left and right-hand boiler installation of the ARP RTD. The red tube seen in these figures is the gas flue tube, make sure the RTD is not in contact with this tube, and the RTD is very well insulated from this heat source.

7. Once the position of the RTD has been determined, rub silicone grease on the clip and the boiler tube to aid with step 8 below. Snap the RTD around the boiler process tube very near the location you determined in step 6.

8. Position the RTD to meet the criteria in step 6 above by sliding the RTD from side to side or up and down.

9. Repack the insulation into the boiler. Pack extra insulation around the sensor and between the sensor and any heat sources such as the flue tube and the electric heaters. Referencing Fig. 2, pack insulation between the flue and the sensor, and under the sensor wire. This will help prevent the heat from flue tube and electric heaters from affecting the RTD measurement and insure an accurate measurement of the boiler tube.

Fig. 2 – Insulate around RTD and Between Wire and Boiler Tube; Be Sure to Insulate between Flue Tube and Sensor.

10. Sharp objects, such as the sheet metal boiler housing can cut the sensor wires. The result is the ARP will detect an open or short of the sensor and report an error. Where applicable, to eliminate this issue, wrap insulation around the sensor wire where it exits the sheet metal boiler housing and use wire ties to secure the wiring so that vibration cannot cause wiring issues.

4.2 Dometic Temperature Sensor

Dometic has two types of boilers as seen in Fig 3a and 3b, the right-hand boiler and the left-hand boiler. Please note the different

relative positions between the RTD sensor and clip for the left or right-hand boilers.

On the Dometic boiler tube, there are usually several crimps to hold the inner pump tube. The best location for the temperature sensor is above these crimps as shown in Fig 3b - Sensor Location 1. If it is difficult to mount the temperature sensor above these crimps, make sure the tip of the temperature sensor is in good contact with the boiler tube so that reliable temperatures are measured by the temperature sensor (Fig 3b Sensor - Location 2).

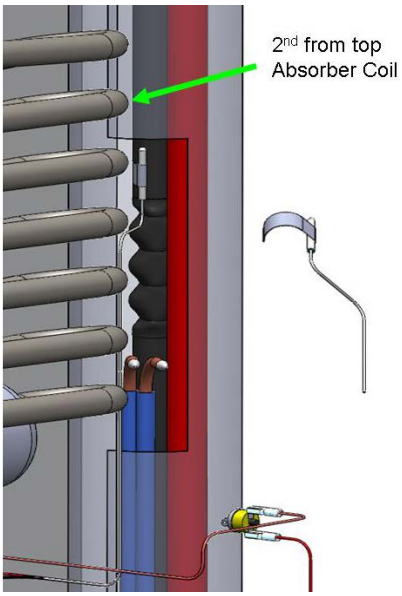


Fig. 3a – Temperature Sensor - Dometic Right-Hand Boiler

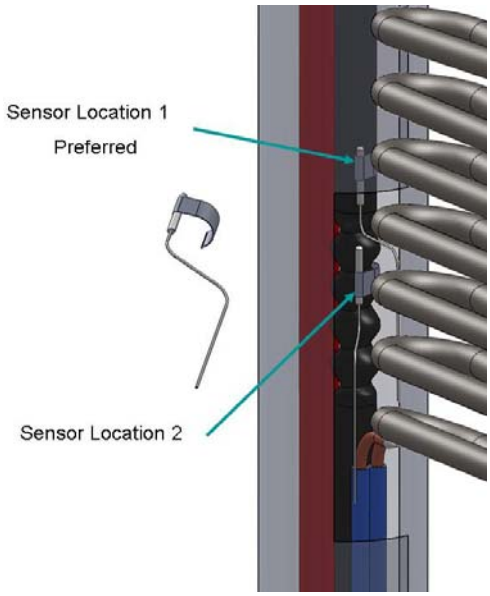


Fig. 3b – Temperature Sensor - Dometic Left-Hand Boiler

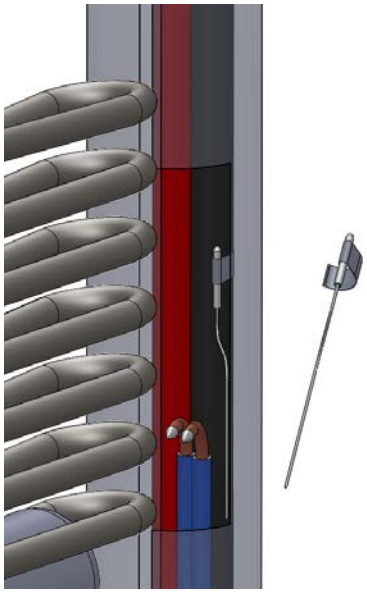


Fig. 4a – Temperature Sensor Alignment - Norcold

Fig. 4b – Temperature Sensor - Norcold

Please see Dometic Install on our Website

4.3 Norcold Temperature Sensor

Most Norcold boiler tubes are located in front of the flue tube; exceptions are N31xx and Polar 7, 8, 10. Thus, the first tube that is seen when accessing the boiler assembly is usually the boiler tube. The location of the flue tube determines the RTD clip alignment in step 5. Generally the Norcold clip would be to the right as seen in Fig. 4a.

INSTALLATION - CONTROLLER

5.1 Mounting Location

We recommend mounting the ARP control within the cooling unit compartment, this is the preferred location. Referencing the figures, you will need to locate the following features of your RV refrigeration system:

- Cooling unit access door (louvered door that accesses the rear of the refrigerator)
- Refrigerator manufacturers' control unit
- Suitable power supply

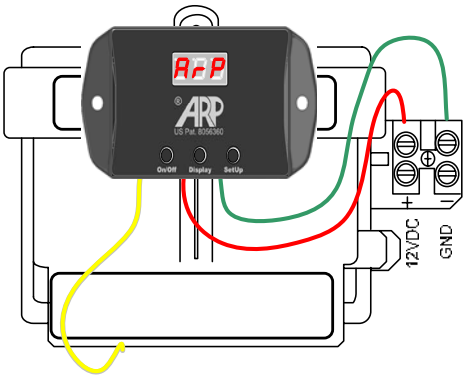


Fig. 5 – ARP Mount on Fridge Control Box

5.2 Interior Location

As of v5.x, we no longer recommend interior installation of our control. There is no need to install on the interior of the RV unless one enjoys gadgets.

If you choose the custom order option at ARPrv.com we can add extended wires for a fee. Contact us before purchase; we do not suggest user extension of the wires due to reliability issue from bad wire connections. We will not warranty any issues that result from self extension of the existing wires supplied with the control.

WIRING the ARP

6.1 Important Information

CAUTION The sequence of wiring, connections, and connector type is extremely important and affects the warranty. See **WIRING OVERVIEW** for wiring sequence and details that affect the warranty.

Fig. 6 – Housing Wire Routing & Water Drain

CAUTION Referencing Fig. 6, the wires attached to the circuit board may not be routed nor exit the housing above the dashed line, and in the zone marked No Route Zone. The AWG 18 gauge wires do not fit under the LED display and the circuit components are vulnerable to damage in this zone. Damage resulting from carelessness is not covered by warranty for any control. Also, the control must be mounted so that the holes at the bottom of the housing are facing down to allow water to drain from the control, failure to mount the control so that there is a drain will void the warranty. In addition, the wires shall have a drip loop so water cannot run down the wire and into the control. The control is not designed for submersion in water.

5.3 Exterior Mounting

Fig. 5 shows a typical installation where the ARP is installed on or near the manufactures' control box. Most of the manufactures controls have 1/4" of clearance between the components inside the box and the outside housing where the ARP is mounted. Please remove the cover to the manufactures' control and check the clearances if in doubt before installing any screws.

DANGER The RV must be disconnected from shore power (120VAC) and 12VDC power removed by disconnecting the batteries before performing any wiring.

Due to variations in refrigerator design to which you may be adding the ARP, the description of how to wire your particular refrigerator may not be listed here. The

following wiring diagrams are minimal, some components are omitted. If you have any difficulty, please contact our technical support.

RV manufactures should fuse the power supply to the fridge with a 5-8 amp fuse. The owner of the ARP Control needs to confirm the fridge power supply has proper circuit protection. For example, referencing Fig. 1b the yellow wire that supplies power to the fridge control and the blue wire that supplies power to fans shall not exceed 8A & 5A respectively. Most fridge controllers or fans do not exceed 2A when functioning properly, thus for most applications where the ARP Control is not powering 12VDC heaters or other high amperage loads associated with the fridge the ARP should perform fine. Please see Fig. 24 for high amperage applications. Install inline fuses or circuit breaker of proper amperage and/or contact support if in doubt.

Once the ARP is installed the installer must test the ARP to insure that the ARP and also the manufactures' control are operating correctly. All absorption RV refrigerators work on similar principles. You can connect the ARP Control to turn off the heat source of your absorption refrigerator using one of 4 methods:

1) Stop power from reaching the manufactures' refrigerator controller.

2) Stop power from reaching the manufactures' flame sensor if the refrigerator has a manual control (see Fig. 23).

3) Stop power from reaching the wire going to or from the manufacturer's temperature monitoring device, such as the boiler thermo-switch or NHTSA type recall kit.

Note: At the time of this writing, the ARP adds a higher level of safety than most NHTSA kits because the ARP measures boiler temperature and turns off the heat source at a lower temperature to avoid damaging the unit. The recalls to date are retroactive devices, they respond after a failure of the fridge rather than preventing the damage that may result in failure of the fridge and in turn fire issues.

WARNING The ARP does not interfere with the NHTSA or other kits provided by the manufactures if and only if the ARP is installed correctly. The ARP must be connected so that manufactures' safety devices continue to perform their normal operation. Do not disable manufacturer safety devices and ensure that they operate properly.

6.2 RV Wire Color-Code Standards

This discussion begins with the fact that there are no standards for RV wiring color-code. For example, power and ground color-code standards for automotive is green for a ground wire and red for +12VDC. ARP will stick to this standard for the wiring drawings.

It is up to the installer to determine the actual color of the power and ground in their RV, these colors are unique to a particular RV and change between two identical RVs.

In many of the ARP wiring diagrams a number in a circle is used to identify components. The reason is to facilitate verbal and written communication of a particular wiring diagram.

6.3 Temperature Sensor Wiring

The RTD temperature sensor is connected to the ARP via a purple/white twisted wire. The RTD wires are not polarized; they may be installed in either position on the sensor.

CAUTION Make sure that no sharp objects such as the sheet metal boiler housing can cut the sensor wire. See Fig. 7b for wire routing to avoid igniter noise.

6.4 Wiring Diagrams Symbols

Fig . 7a is the symbol used in the following wiring diagrams to indicate a wire that will be removed from the fridge and replaced by the ARP Control wiring.

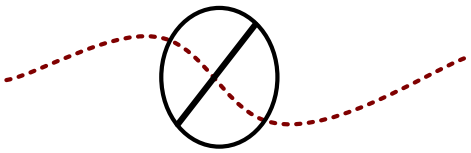


Fig. 7a – Wire Removal Symbol

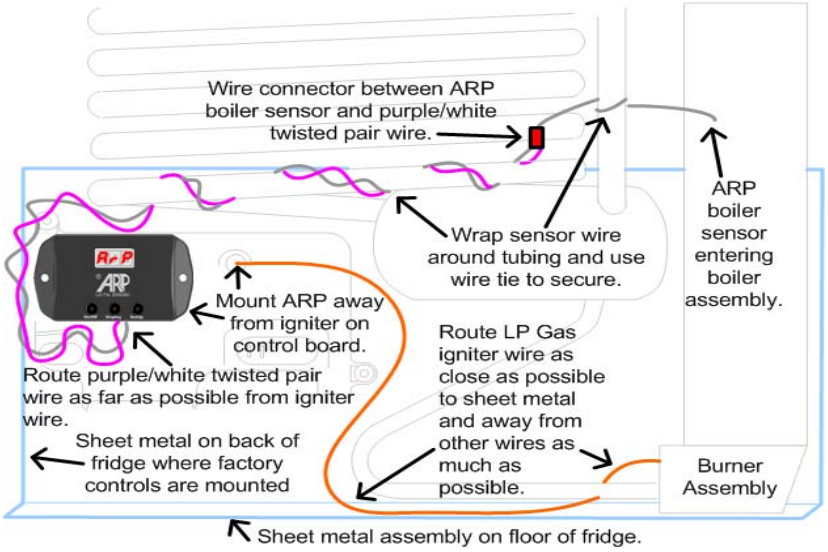


Fig. 7b – Boiler Sensor Wire Routing

NORCOLD WIRING GUIDE

7.1 Norcold Early Style Controls

Fig. 8 is a typical early style control board. Please use Web Resources for details.

7.2 Early Housing Switch Recall

Fig. 9 drawing shows the fridges such as the N410, N510, N611 and N811 with the boiler housing thermal switch.

7.3 Late Housing Switch Recall

Fig. 10, the only difference between this wiring and Fig. 9 is that the ARP is wired inline with the Norcold controller power supply rather than the thermal switch.

7.4 Early Style Norcold Recall

Fig. 11 has been included for the special case of wiring the N611, N811 and 1200 series Norcold fridges that have the NHTSA recall kit. Note, the recall ground is not shown.

7.5 Late Style Norcold Recall

Fig. 12 only differs from Fig. 11 by the way that the ARP Control is wired directly inline with the Norcold control box power supply. Note, the recall ground is not shown.

7.6 Late Style Norcold 3-Way

Fig. 13 shows the late style Norcold 3-way fridge wiring. Caution needs to be exercised to wire the ARP Control so that the 12VDC electric heaters are not powered through the ARP Control. If in doubt, be sure to put a 3A inline fuse on the ARP red wire for testing.

Please see 6.2 RV Wire Color-Code Standards for wiring diagrams.

7.7 Norcold N7, N8, & N10.

Fig. 14 shows the Polar series refrigerators. Please use this guide combined with the following webpage for install: Norcold N7x; N8x; N10x Webpage

7.8 Norcold N3104 & N3150

Fig. 15 shows the wiring for the N31xx fridge.

Please use this guide combined with the following webpage for install: Norcold 31xx Webpage

Click Here for ARPrv.com Web Resources to use with Following Diagrams

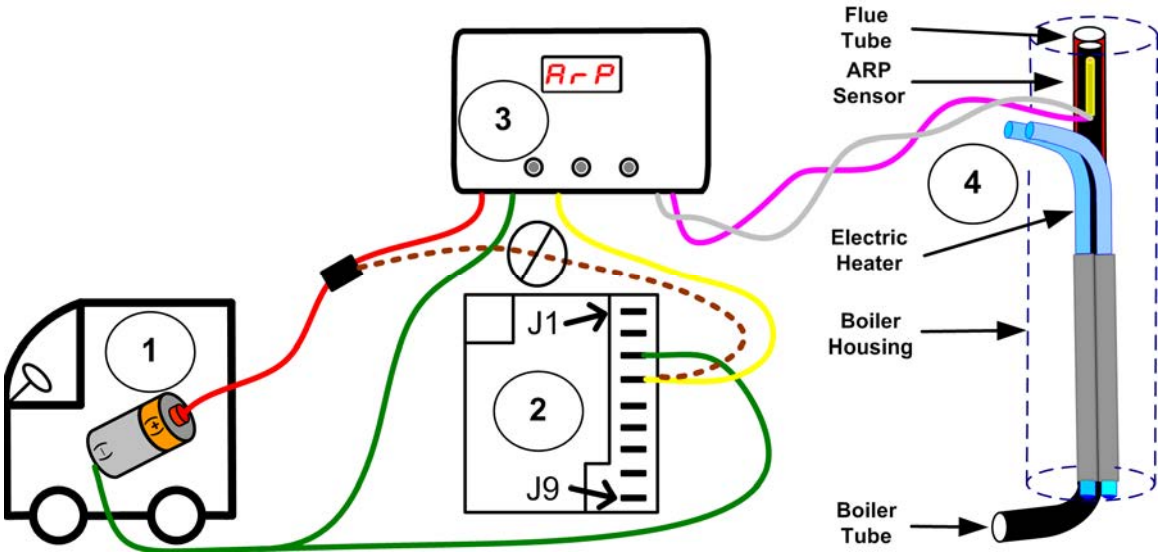


Fig. 8 – Early Style Norcold Control Wiring

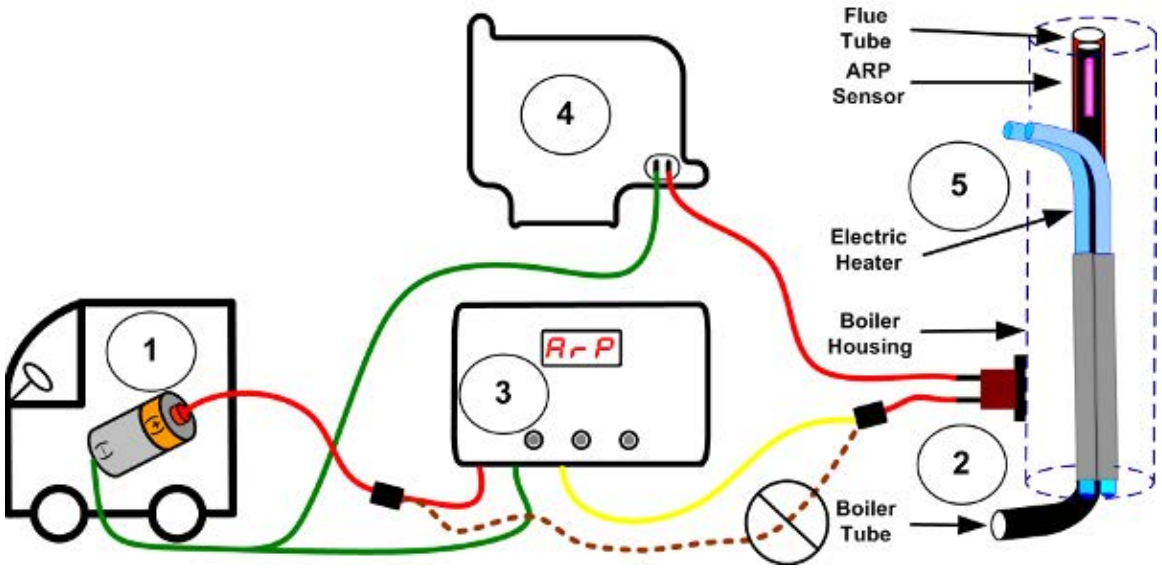


Fig. 9 – Typical 2 Door Norcold Install with Boiler Thermal Switch

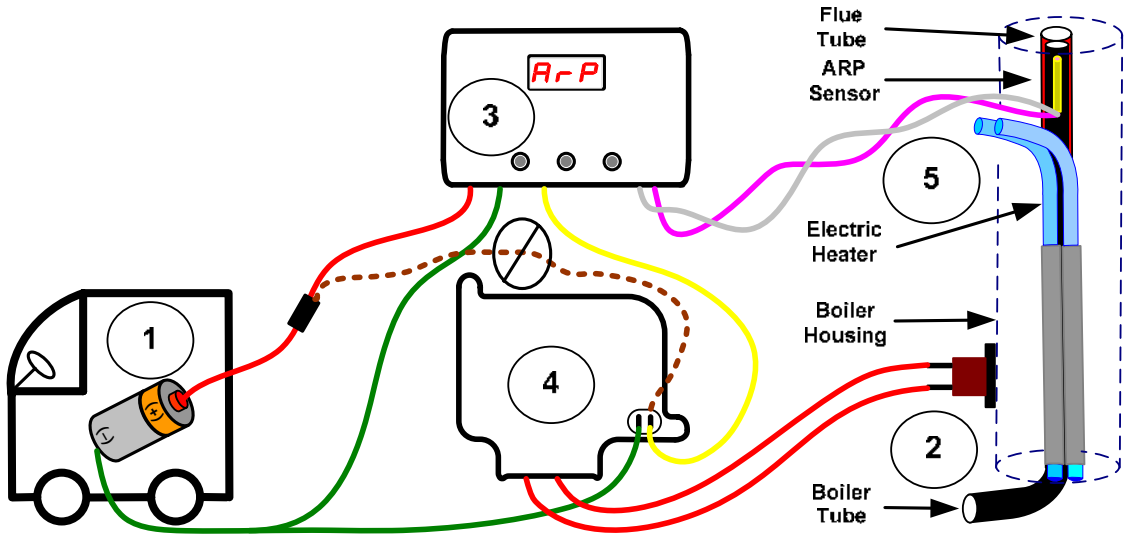


Fig. 10 – Late Style Norcold with Boiler Thermal Switch

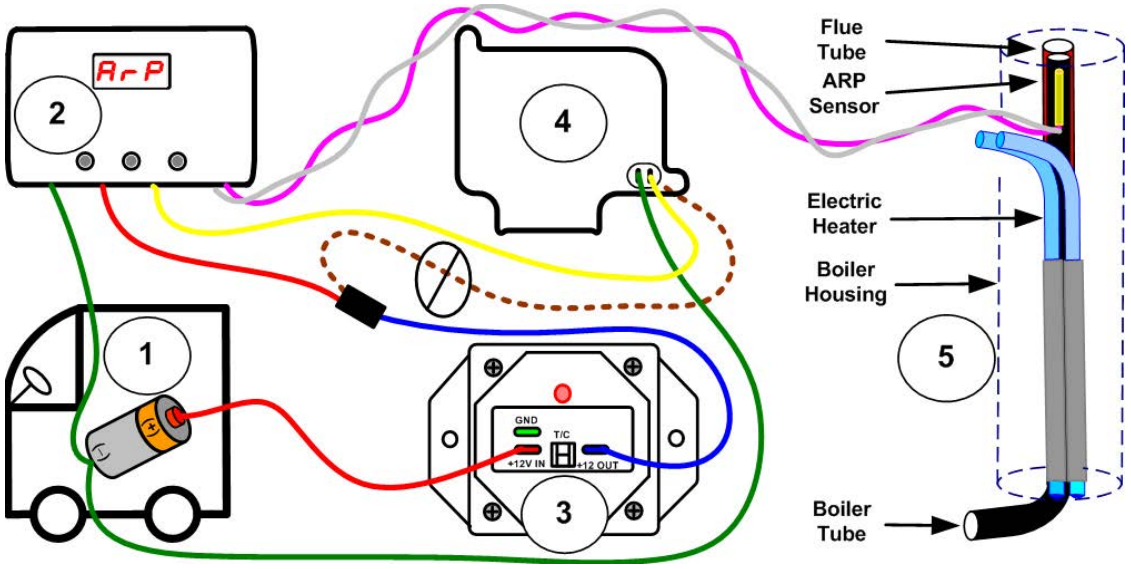


Fig. 11 – Early Style Norcold Recall Wiring

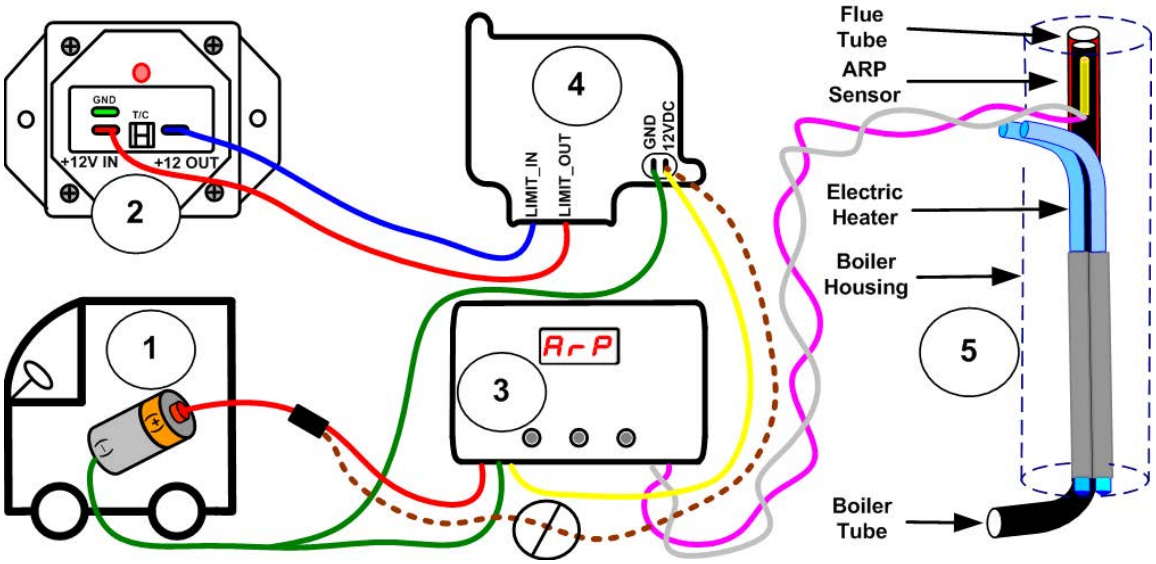


Fig. 12 – Late Style Norcold Recall Wiring

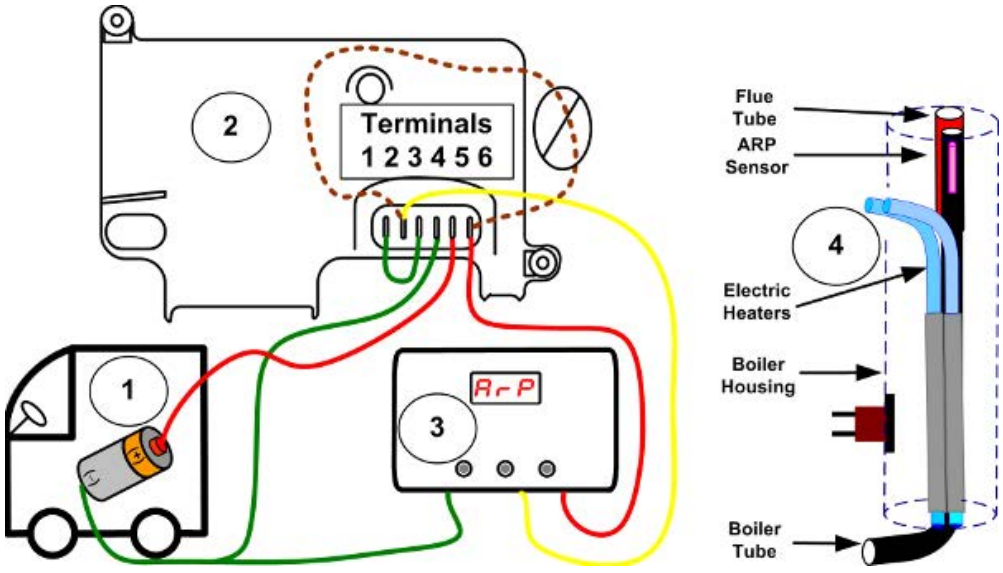


Fig. 13 – Late Style 3-Way Wiring

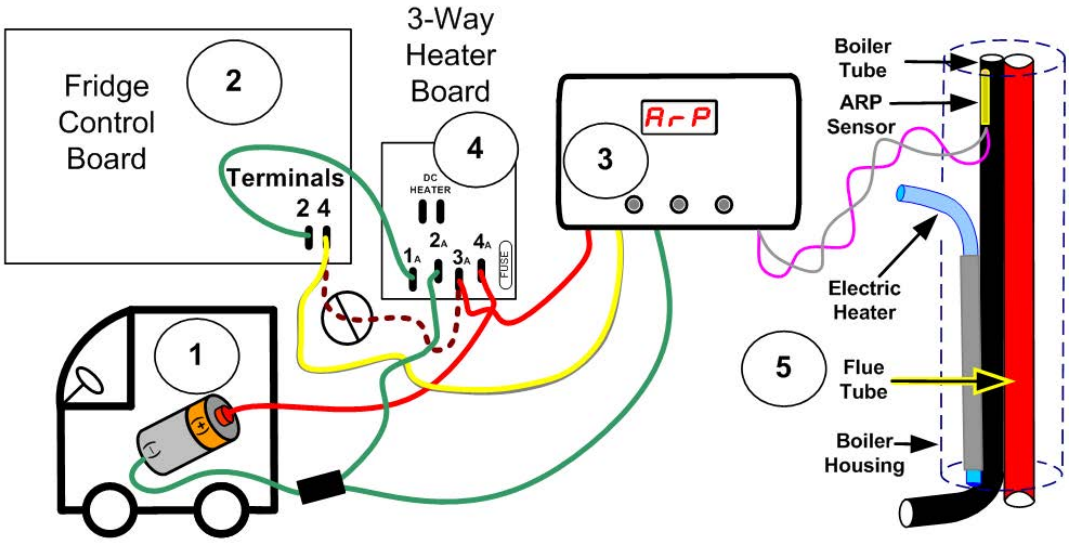


Fig. 14 – Polar Series 3-Way

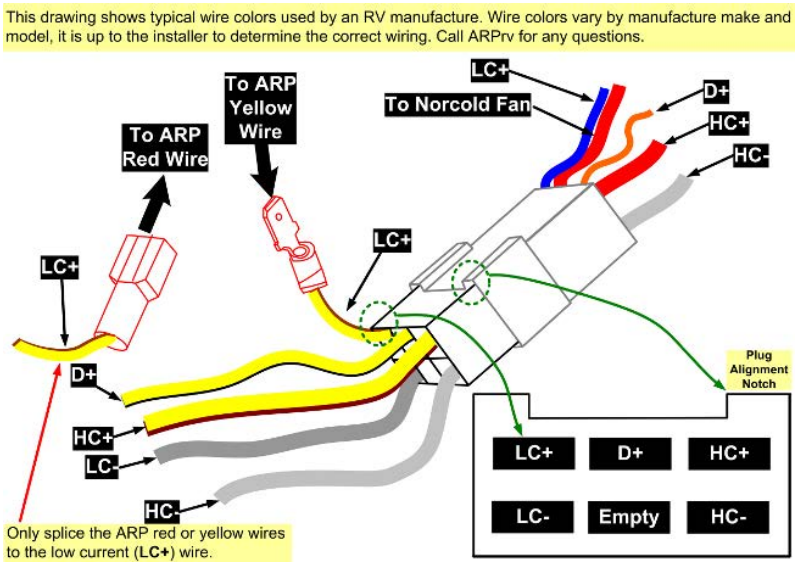


Fig. 15 – N3104 & N3150

DOMETIC WIRING GUIDE

Note1: The boiler assemblies in the following drawings are all right-hand boilers with the exception of the RM1350. If your fridge has a left-hand boiler the following wiring diagrams still apply. Please see Fig. 3a and Fig. 3b for the respective boiler drawings.
Note2: The brown dashed wire with the circle-x symbol represents the original wire found on the 12VDC power supply to the fridge which is replaced by the ARP wiring.

8.1 Typical Dometic without Recall

Fig. 16 shows the early style controls that did not have any recall devices.

8.2 Early Housing Switch Recall

Fig. 17 shows the early style boiler housing thermal switch where the power supply is wired through the housing thermal switch.

8.3 Late Housing Switch Recall

Fig. 18 is identical to Fig. 17 with the exception that the factory wiring of the boiler housing thermal switch is directly to the Dometic control board. The ARP is wired inline with the RV power supply to the fridge control in this case.

8.4 Late Model 3-Way

Fig. 19 shows Dometic 3-Way wiring of the ARP Control. Please note that the 12VDC heater draws high amperage, thus Dometic installs the relay identified as #6 in the drawing.
The ARP must be wired inline with the fridge control board power supply in this case. Click here for early 3-Way Fridge.

8.5 RM1350 Type 3-Termanal

Fig. 20 shows the RM1350 with the three terminal blocks. Please note that the 3rd terminal is labeled **D+**. This is a special case for wiring the ARP Control. Note that the ARP is wired between the RV power supply and the terminal block (**+**). ARP boiler sensor wiring is omitted for clarity.

8.6 RM 84xx & RM 85xx

Fig. 21 & 22 shows the wiring for the RM 84xx and RM 85xx fridge. The figure used depends on how your fridge was wired from the factory.

Please use this guide combined with the following webpage for install: RM 84xx & RM 85xx Webpage

Click Here for ARPrv.com Web Resources to use with Following Diagrams

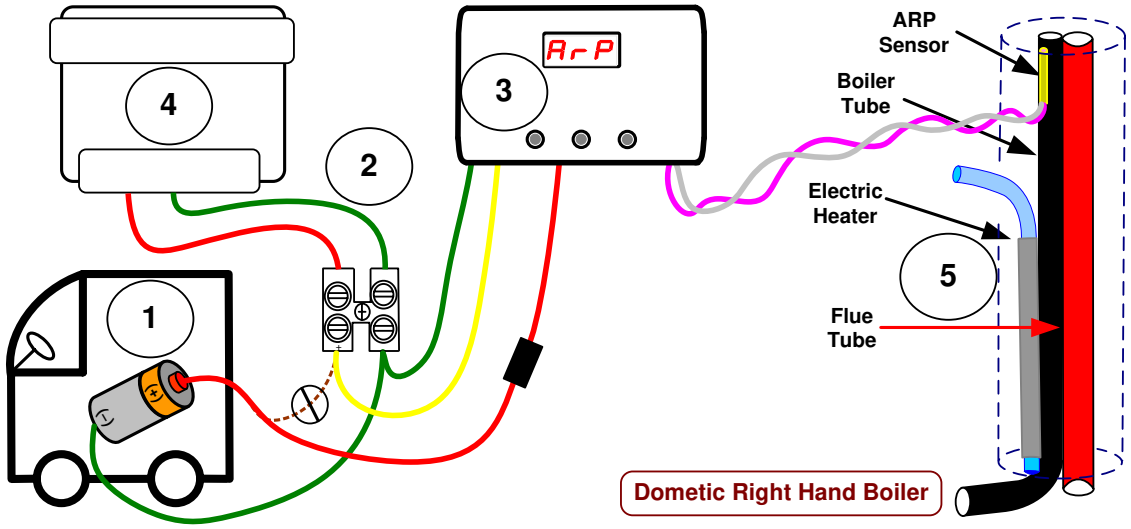


Fig. 16 – Dometic without Thermal Switch Wiring

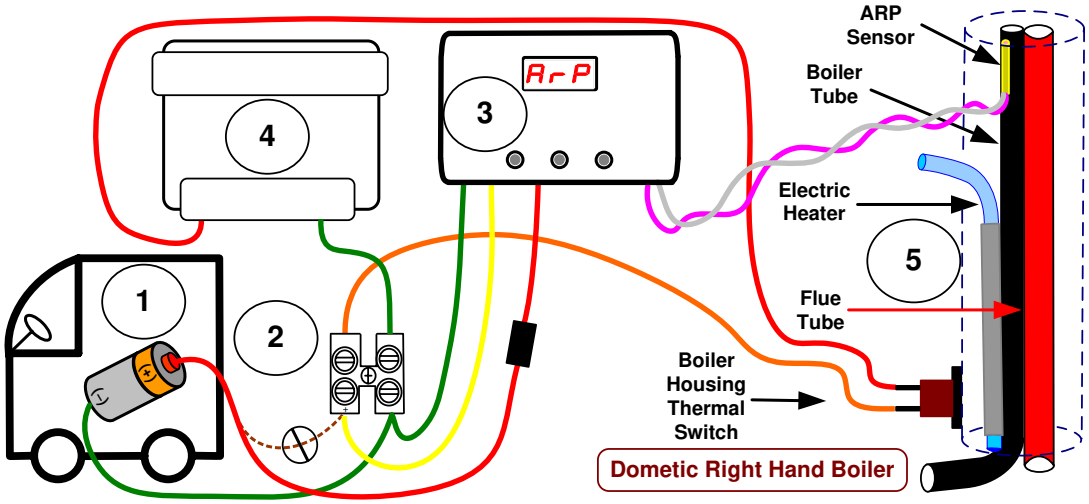


Fig. 17 – Early Dometic with Thermal Switch Wiring

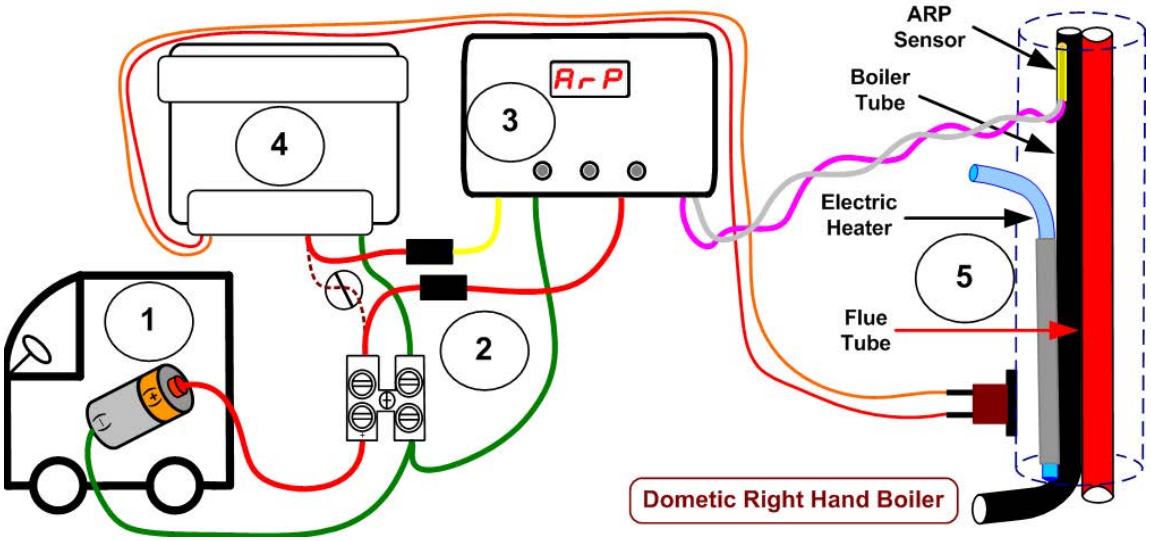


Fig. 18 – Late Dometic with Thermal Switch Wiring

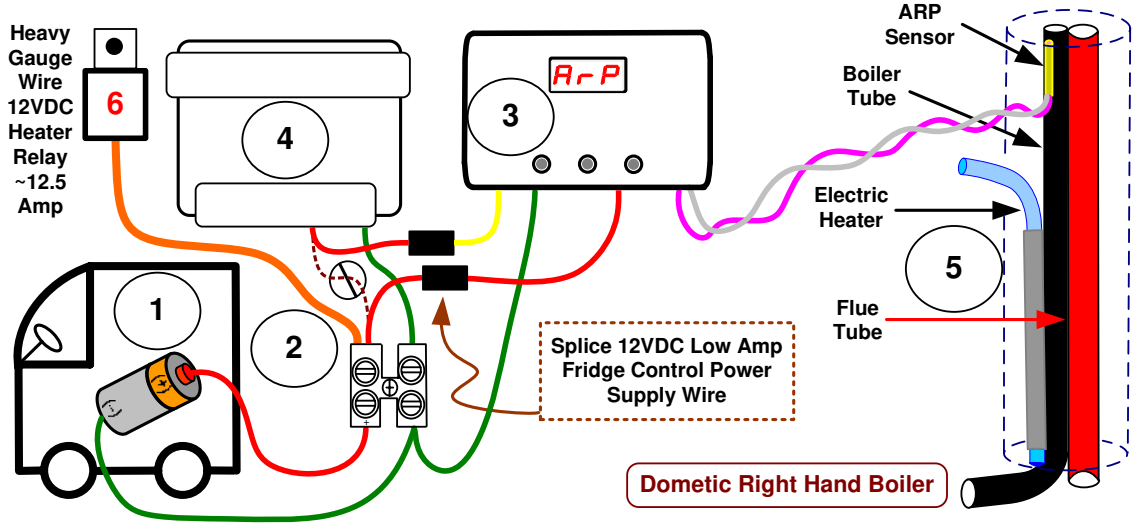


Fig. 19 – Late Dometic 3-Way

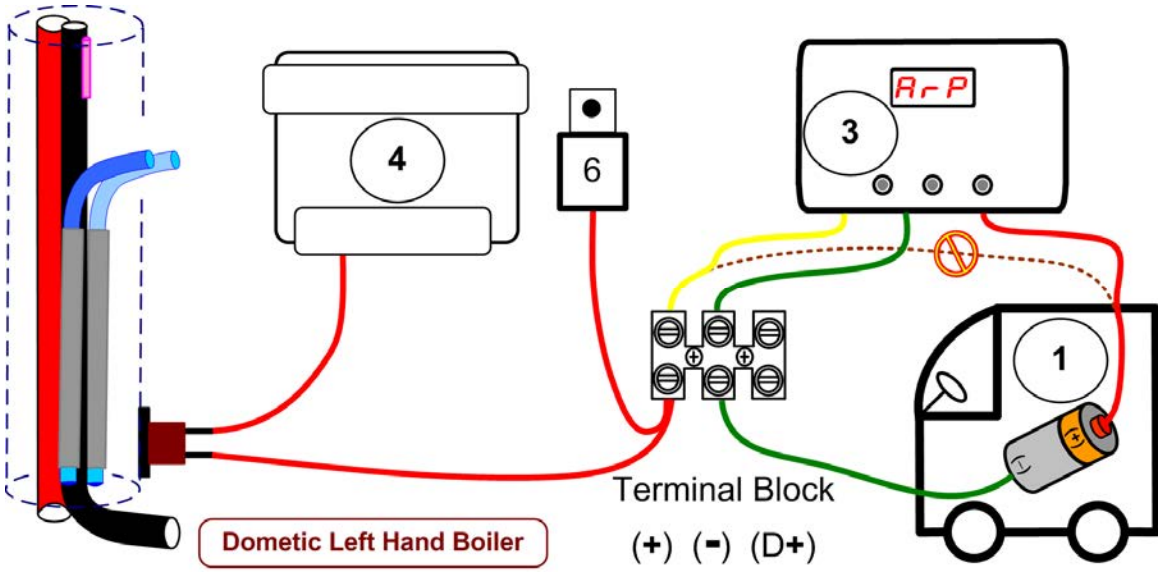


Fig. 20 – Dometic RM1350

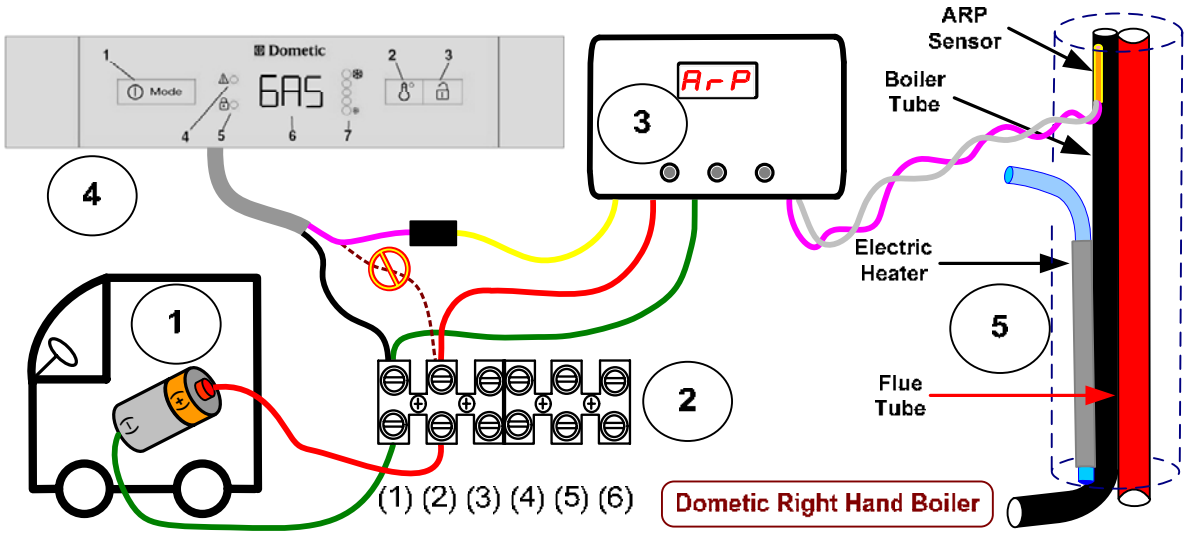


Fig. 21 – Dometic RM8555 without Thermal Switch

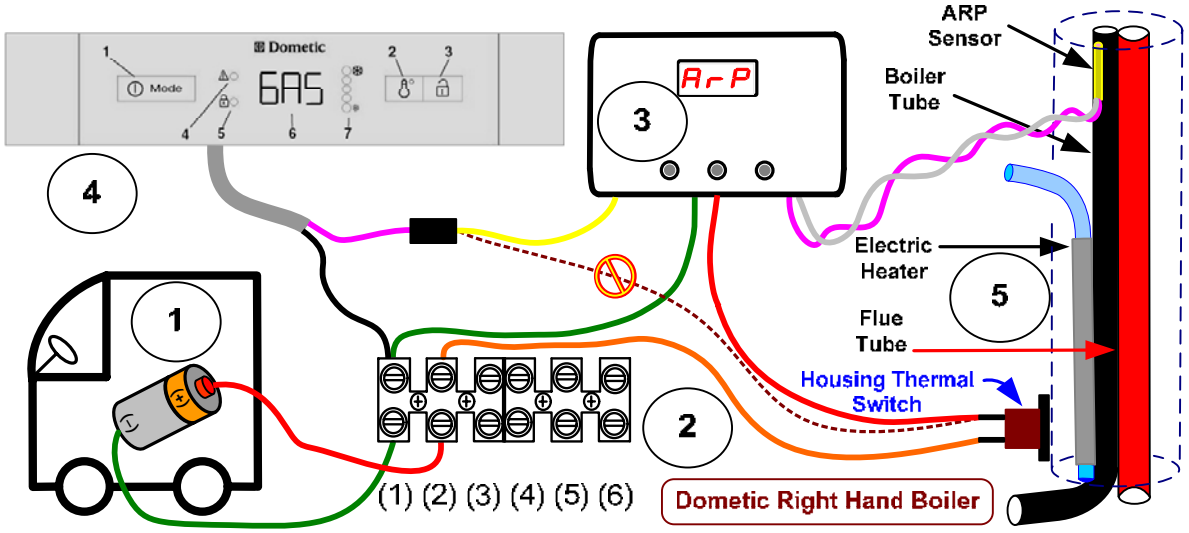


Fig. 22 – Dometic RML8555 with Thermal Switch

MANUAL FRIDGE CONTROL & HIGH AMP INSTALL

9.1 Relay Overview

Fig. 23 shows the recommended Tyco relay P/N 0-1432793-1. This relay is the only type of relay to use with the ARP Control up to v4.x. The v5.x relay just needs to be a 12VDC activation coil type. Terminal **86** is the +12VDC relay activation and terminal **85** is the activation ground. These terminals must have a clamping diode; this is why this type of relay is required for v4.x and earlier.

⚠ **WARNING** The ARP internal relay is not warranted against failure due to over voltage conditions by improper relay installation.

9.2 Typical Manual Fridge Control Norcold and Dometic

Fig. 23 shows the aforesaid relay configuration for the control of the manual type refrigerator safety thermocouple (TC) in combination with a TC Interrupter.

9.3 Early 3-Way Norcold and Dometic & Dometic NDR1402

Fig. 24 can be used when wiring either a high amperage application (greater than 5A) or if one desires to mount the ARP remote with long wires controlling the fridge with a relay.

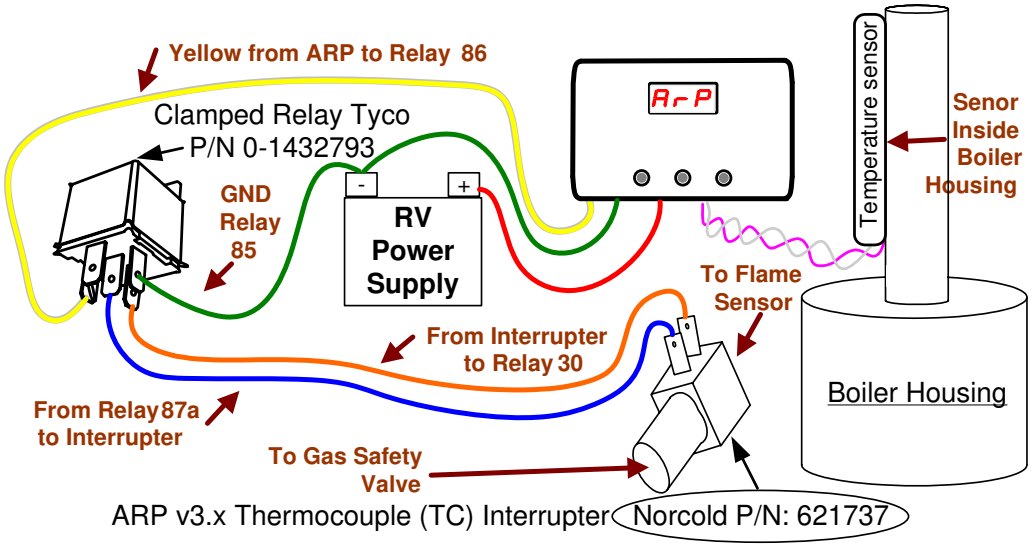


Fig. 23 – Typical Wiring for Manual Control Fridge

NOTE: The Periodic Test for 5.x control must be turned off for manual control fridge. See the Troubleshooting Guide section 2.17 Defrost Setting/IEC Periodic Test

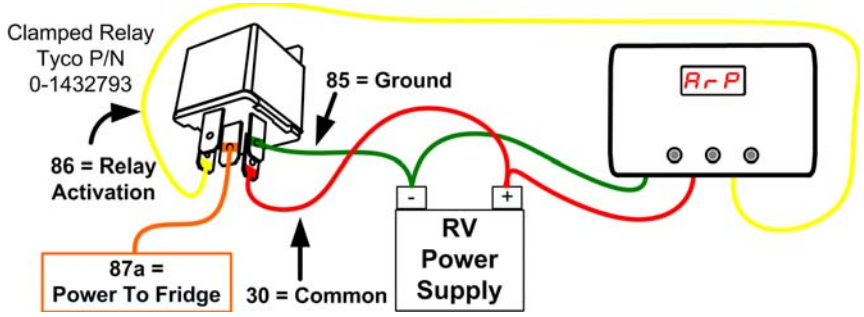


Fig. 24 – Remote Mount, or High Amperage Fridge Application

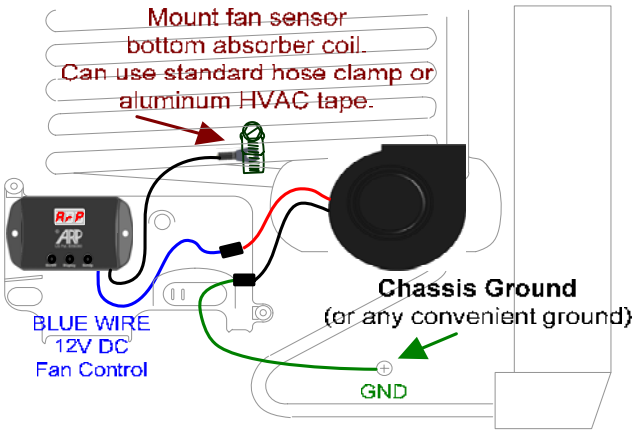


Fig. 25 – Mount Additional Cooling Fans

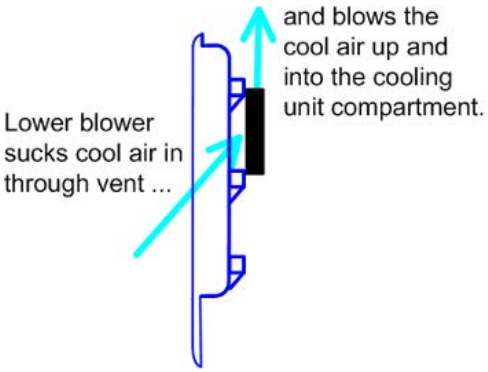
ARP + FAN CONTROL

10.1 Mounting Fan Sensor

The ARP + Fan Control will help increase the efficiency of your fridge by forcing air into the cooling unit compartment with fans. The fans will only run when needed, thereby saving energy. Fig. 25 shows the location on the cooling unit to install the fan sensor. The fan sensor is installed on the bottom absorber coil. The sensor can be clamped to the

absorber with a typical hose clamp as seen in Fig. 25. Or, aluminum HVAC tape can be used to secure the fan sensor.

Click here for web search for fan install.



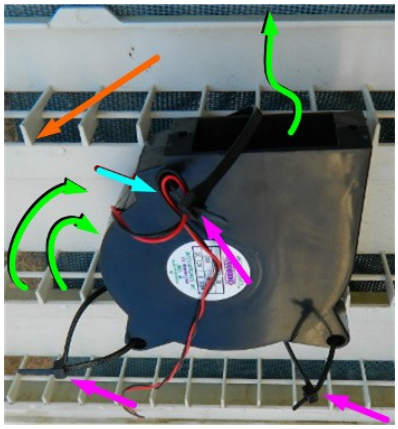


Fig. 26a & 26b – Lower Ventilator Fan Mounts to Door – Suck Cool Air In & Blow Up

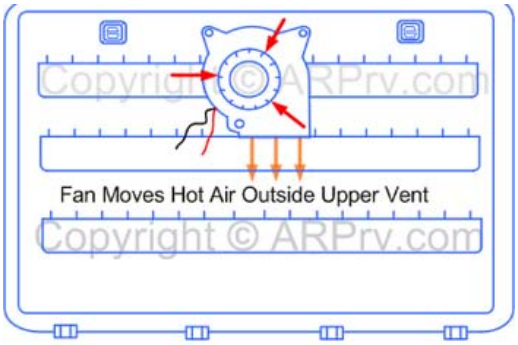


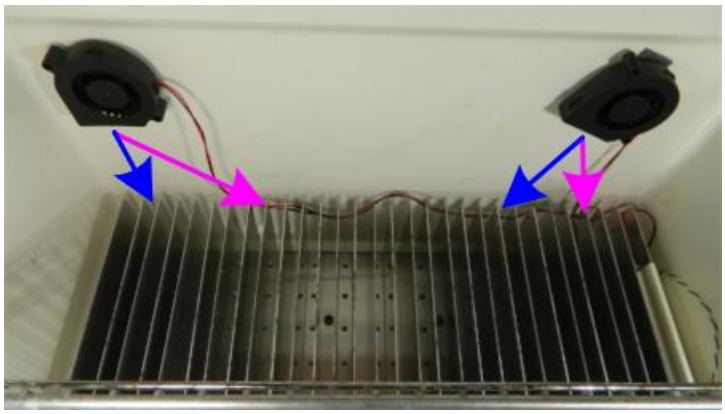
Fig. 27 – Mount Upper Side-Vent Fan

10.2 Mounting Ventilator Fans

The lower vent fan mounts to the door so that it sucks cool air in (green arrows Fig. 26b) from outside of the RV. This is the key to the works. Use thin wire/zip ties to mount the fan to the vent door louvers as seen in the right photo above.

For side-vent application, the second blower fan is mounted on the upper vent door (Fig. 27) in the same manner as the lower vent, with the exception that the fan is mounted to the vent door so it can suck the hot air out of the cooling unit compartment and blow it to the outside. In some applications, the vent is so close to the fridge that there is not enough room for the large ventilator fan, in this case 2 or more of the small defrost fans can be used.

10.3 Mounting Defrost/Circulation Fans



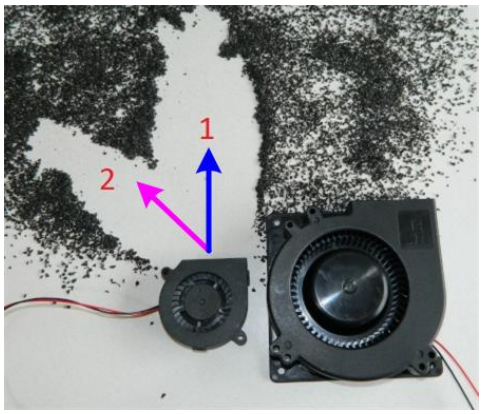
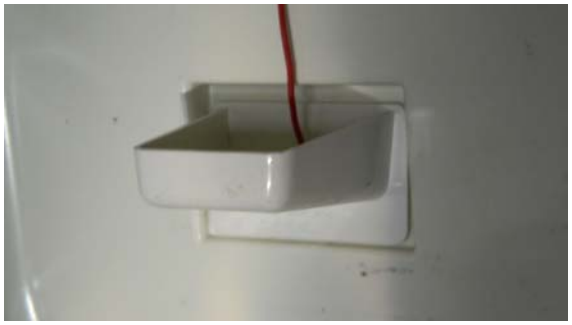


Fig. 28a & 28b – Defrost & Circulation Fans

The left photo (Fig. 28a) above shows the defrost fan installed within the refrigerated compartment ceiling. We suggest using Velcro tape to install the fans, this way they can be adjusted with ease. A

butter knife can be used to remove the fans by placing it between the two Velcro strips and carefully popping the fan off for adjustment.

The blue and purple arrows show the fan blow pattern. Please note that the right photo is showing a demonstration of the blow pattern so that one can see how the air exits the fan. Then, by looking at the orientation of the left photo one can see how the fan has been adjusted by rotation to achieve the maximum defrost effect. When the fans are in service, if frost is building up in a spot, adjust the fan by rotation to blow on the affected area of the fins. Please note, the important area to keep frost free is the thermistor. Frost not only insulates the fins, it insulates the thermistor so that the Dometic or Norcold control cannot maintain the fridge temperature properly. Some frost on the fins is normal.



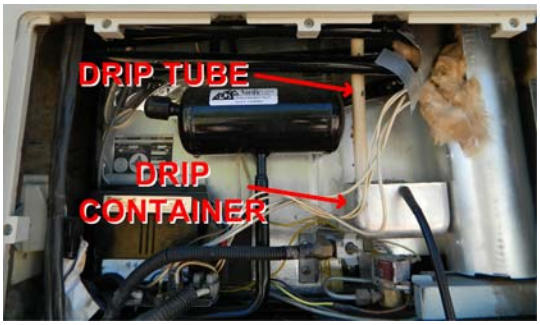


Fig. 28c & 28d – Drip Tube Wiring for Internal Fans

The left photo shows a typical Dometic drip tray receptacle, the Norcold drip tray tub is connected directly to the drip tray under the fins inside the fridge. The defrost fans will be grounded to the interior light ground, the positive fan wire will be run out through the drip tube as seen in the left photo.

The right photo shows a typical drip tray; at the end of the drip tube there is usually a plug that restricts the air flow into the drip tube. This plug can be removed to install the defrost fan power wire; it is optional to put the plug back in, the wire offers enough restriction.

The defrost power wire is connected to the blue Fridge Defend fan control wire. The fan setting can be lowered so that the fans run more often in cold weather if needed.

The internal & external fans increases the efficiency of the fridge so much that one may have to turn down the fridge setting to keep from freezing food and/or prevent frost buildup due to the fridge being too cold.

BYPASS ARP CONTROL

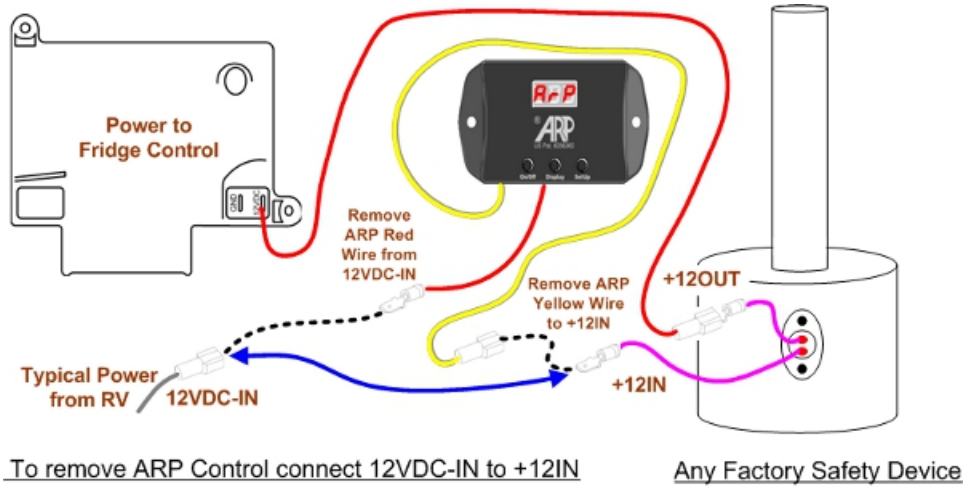


Fig. 29 – Bypass ARP to Meet Legal Conditions of Factory Warranty

11.1 Why and How to Bypass ARP

The ARP Control increases safety, reliability, and efficiency of you RV fridge in most cases. Magnuson Moss Warntee Act was enacted to prevent the abuse of consumers by unscrupulous venders which try to insinuate that your warranty is void due to the addition of a device such as the ARP Control. Fig. 29 shows how to bypass the control to meet any OEM warranty requirements or to remove the ARP from the system for troubleshooting purposes.

POST INSTALL

12.1 Testing ARP Install

⚠ **WARNING** Once the ARP has been installed, please see the User Guide to test the installation. The User Guide sections **Test ARP Relay** thru **Test Fan Relay** discuss the button sequence for this operation. See the Troubleshooting Guide for any error messages displayed.

12.2 What Set-Point Function Should I Use?

The ARP Control default settings works for a majority of Dometic and Norcold refrigerators see summery of settings for exceptions. If your fridge does not work properly with the default settings there are 3 Set-Point Function settings, see the **Troubleshooting Guide** along with the **Ancillary Graphical User Instructions** for information required to change the setting. Also, the information following assumes that the ARP temperature sensor has been installed correctly.

Summery of the Settings:

C-H: Default set-point function. This setting works for a majority of fridges. Some older Dometic, Amish Cooling Units, and Norcold model 1210 and 2118 cooling units made after the year 2013 will require the PID mode.

C-L: If you have a small fridge, such as a 3 cubic foot fridge, the ARP Control should be set to the C-L set-point function. The C-L set-point function has a lower set-point value for smaller fridges. How will you know if your fridge needs the C-L mode? If you put the ARP into the C-L set-point function and the ARP turns off the fridge approximately one hour after the fridge starts, the C-L set-point function control value may be too low, in this case return the control to the C-H setting.

PID: The PID mode is designed for older Dometic, Amish Cooling Units, and Norcold model 1210 and 2118 cooling units. Click here to ID Norcold 1200 require PID. If the C-H set-point function does not work on your fridge, the PID setting may be needed on your fridge. Also, we have found that some (this is rare) Norcold 2118 refrigerators need the 'SP' value raised from the default of 5 to 10.

Click here for web resource to change to PID Set-Point Function

CONCLUSION

The ARP Control can be wired using many different configurations, all of which depend on the installer's preference and the wiring of the RV. The installer **shall test the ARP** upon installation to check the function of the control. Please see the User Manual for the procedures to test the internal relay operation. In addition, test to make sure that the RTD temperature rises when the refrigerator is turned on.

Finally, Fig. 29 shows how to bypass the ARP Control for either troubleshooting or to meet factory warranty conditions. Due to legal considerations, refrigeration manufactures' and their

representatives cannot refuse a warranty nor refuse to work on your fridge if the ARP has been bypassed as shown above.

WARNING Before putting the ARP Control into service, the installer must insure that the ARP Control functions properly and does not display any error messages on the LED display (see Troubleshooting Guide for error messages). Due to the ARP Control being universal, and the fact that all RV and fridge manufactures have variations in their wiring, construction, and controller design, all circuits shall be fused properly and the fridge owner takes full responsibility for their RV wiring including the fusing of circuits. The end user must understand the operation of the control so that safe operation occurs at all times. Use this document in conjunction with the User Guide and the Troubleshooting Guide for safe operation.

Your job is everyone's safety ☺

This manual has been provided courtesy of My RV Works, Inc.

www.myrvworks.com

You can find more RV service manuals here:

www.myrvworks.com/manuals

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!

DARREN KOEPP - OWNER, MY RV WORKS, INC.

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