

DOMETIC

Air Conditioners & Heat Pumps

- **Brisk Air II**
- **Penguin II**
- **High Efficiency**
- **Air Command**
- **High Performance**
- **Blizzard NXT**

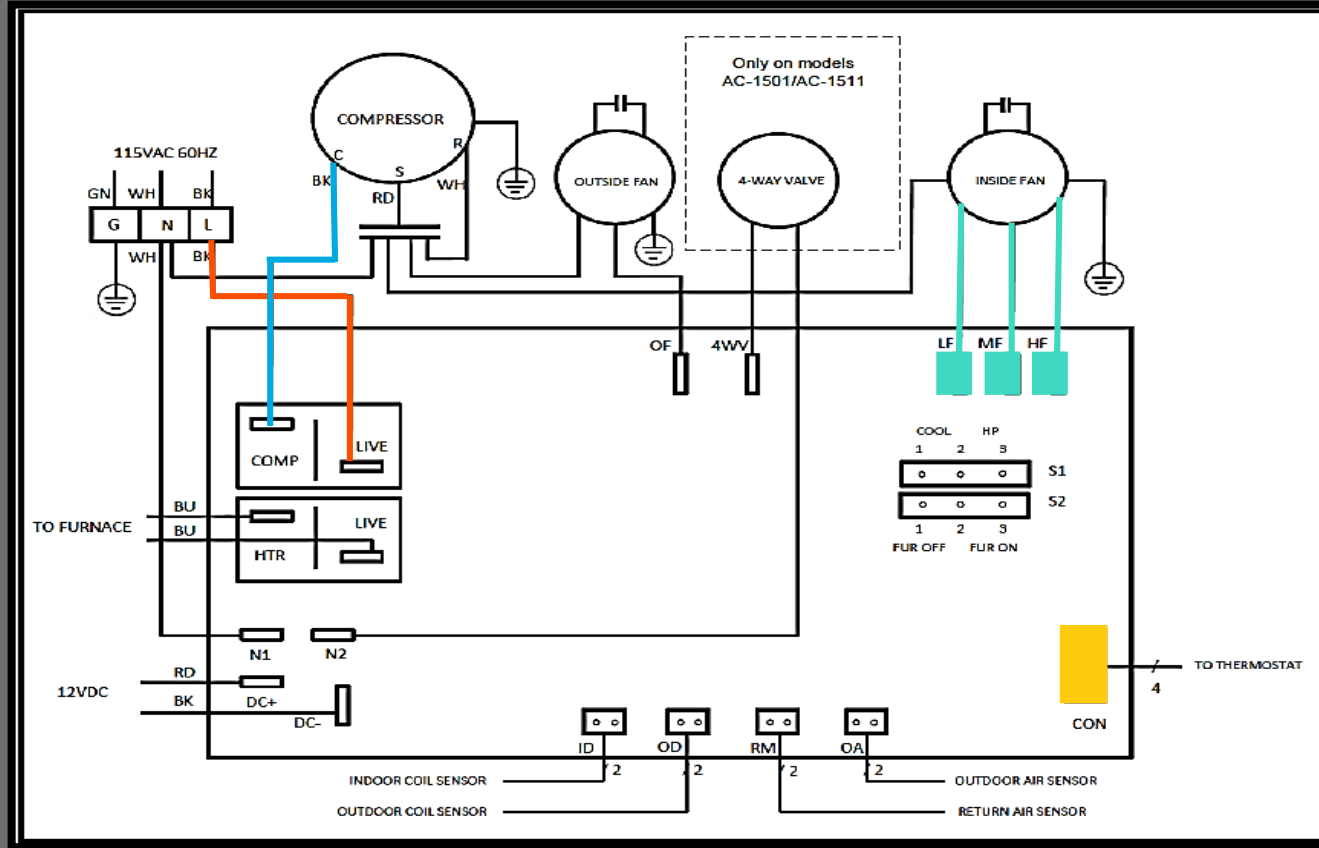


Atwood Air Command

Mobile living made easy.

 **DOMETIC**

Air Command Wiring Diagram



Air Command Wall Thermostat

Temperature Display:

Display timer setting, set room temp in C or F

Infrared Sensor:

To receive wireless handset signal

Temperature Adjustment

Timer Button:

Press to activate on/off timer programming mode

Fan Speed Button:

Press to select AUTO, HIGH, MEDIUM, or LOW

Furnace Button:

This button is valid in Heat Pump & Furnace model only. Press once to select furnace as primary heat. Press again to cancel furnace as primary heat. Furnace will override HP operation if ambient temp is below 45 F.

On/Off Button:

Press once to start
Press again to stop

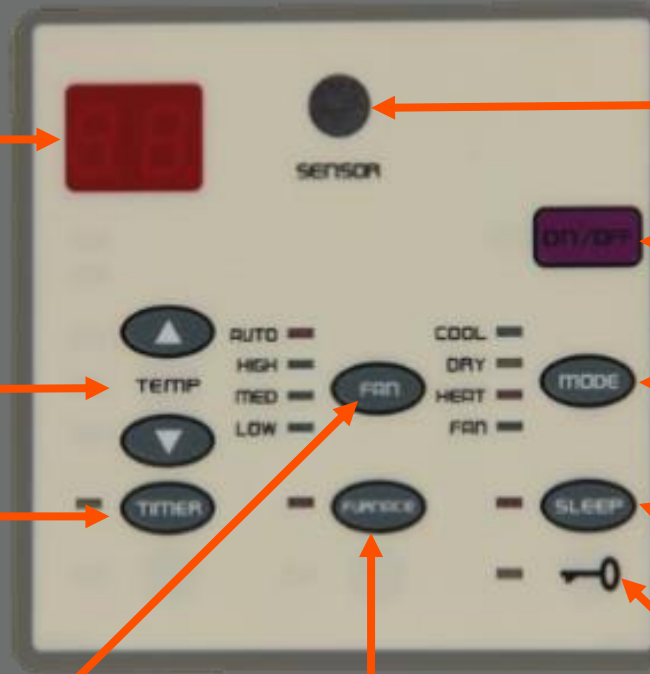
Mode Button:

Press to select cool, dry, heat, fan, or auto operation

Sleep Button:

Press once to select sleep mode.
Press again to cancel

Key Lock



Air Command Interrogation Mode

- Must be in LOCK mode.
- Keep thermostat on and Press simultaneously DOWN and MODE for 3 seconds.
- Will display KEY symbol.



Interrogation Mode Cont.

Interrogation Command	Menu	LED Indication	Remarks
01	Indoor Coil Temp	Auto Fan Flashing	
02	Outdoor Coil Temp	High Fan Flashing	
03	Outdoor Air Temp	Medium Fan Flashing	
04	Main Board Room Temp	Low Fan Flashing	
05	Wall Pad Room Temp	Auto Fan Flashing	
06	AC Voltage Supply	Auto and Medium Fan Flashing	Voltage Available Shows "AC" else "--"
07	Fan Control in Furnace Primary Heating	Auto and Low Fan Flashing	Fan On Shows "F0" else "FF"

Air Command Error Codes

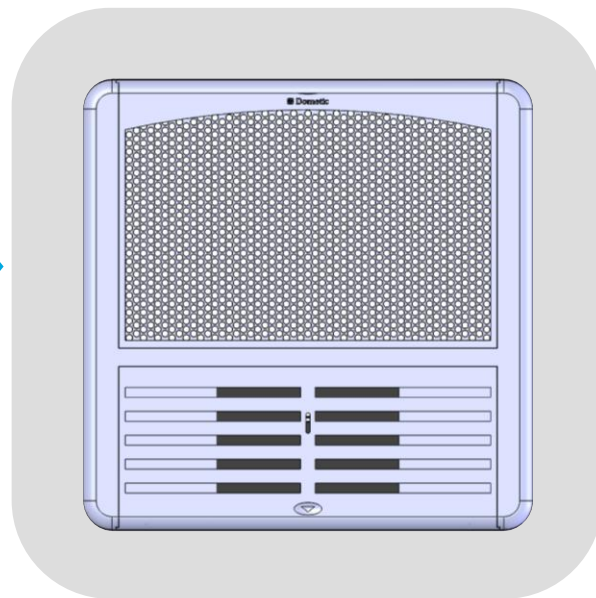
Error Code	Fault
E1	Room sensor failure
E2	Indoor coil sensor failure
E3	Outdoor coil sensor failure
E4	Insufficient refrigerant
E5	Compressor Overload
E6	Not used
E7	Not used
E8	Outdoor air sensor failure
E9	Wall control room sensor failure

Air Command Ducted

Excessive Condensation Issues

Some Atwood Air Command units installed for Ducted applications have been known to have heavy condensation problems in high humidity conditions.

If you come across this situation and the unit has the original Atwood Return Air Grille, replace it with the Dometic Quick Cool Vent. You will also need a second part for this conversion as the Atwood vent had a larger footprint than Dometic's vent.



We made a trim garnish to go around the Quick Cool Vent to cover the previous (now exposed) screw holes.

Quick Cool Vent PN: **3315930.010**

Garnish Ring PN: **3317203.000**



Dometic Air Conditioner Family

Mobile living made easy.

 **DOMETIC**

**BRISK AIR
BRISK AIR II &
HIGH EFFICIENCY**



**HIGH PERFORMANCE &
BLIZZARD NXT**



**PENGUIN &
PENGUIN II**



Brisk Air

- **COOL ONLY**
- **HEAT PUMP**
- 13,500 BTU
- 15,000 BTU

13.5" Height



Analog



SZLCD



CT



CCC 2



CCC 5 Button



Brisk Air II

- **COOL ONLY**
- **HEAT PUMP**
- 13,500 BTU
- 15,000 BTU



Analog



SZLCD



CT



CCC 2

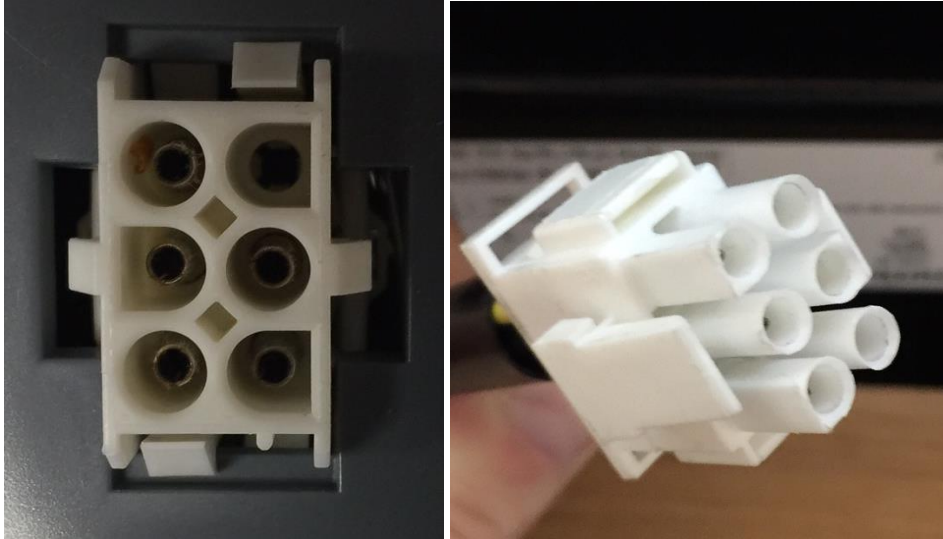


CCC 5 Button

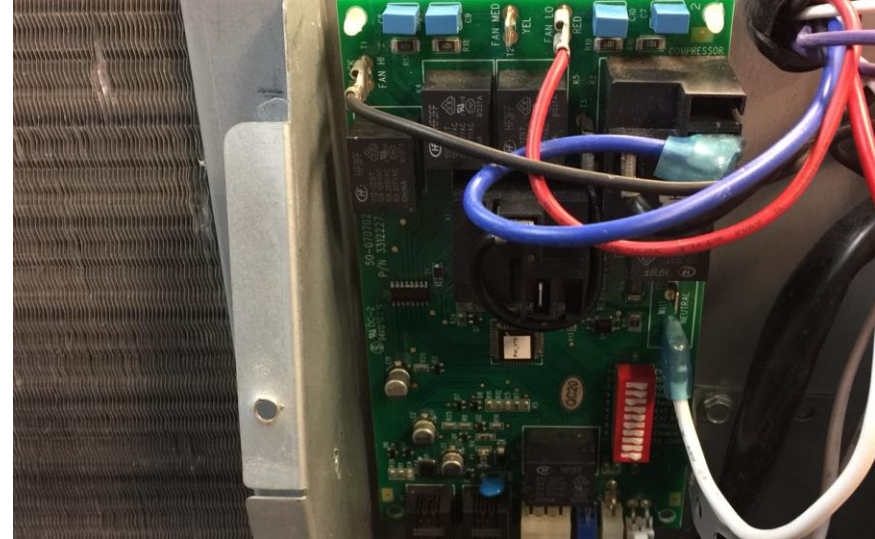


Modularized (Plug-n-Play) vs. Pre-installed Control Boards

Plug-n-play units, which are primarily Brisk AC units, have a six pin umbilical cord that will come from the upper AC unit and plug into a separate control box/board.



Pre-installed control boards are mostly installed in Penguins and Blizzard units. These will have the control board installed in the upper unit and are designed to ONLY work with a specific wall thermostat.



Brisk Air II High Efficiency Model

Brisk Air II HE units are designed to operate when incoming power is below ideal conditions

- High Efficiency
- B59530 Series
- Low amp draw
- 15 amp breaker with a time delay fuse
- You can operate 2 HE's on a 30 amp service
- Used with CCC 5 Button, CCC2, SZLCD, CT, Analog, & Mechanical controls

Unit draws roughly 11 amps (compressor and fan) at design specifications.



No Heat Strip Option Available

Brisk I vs Brisk II

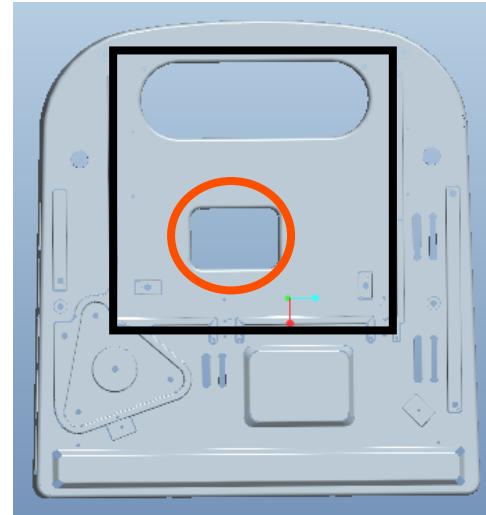
Discharge Air Outlet

Brisk I



Rear Corner Discharge Air
Delivery System

Brisk II



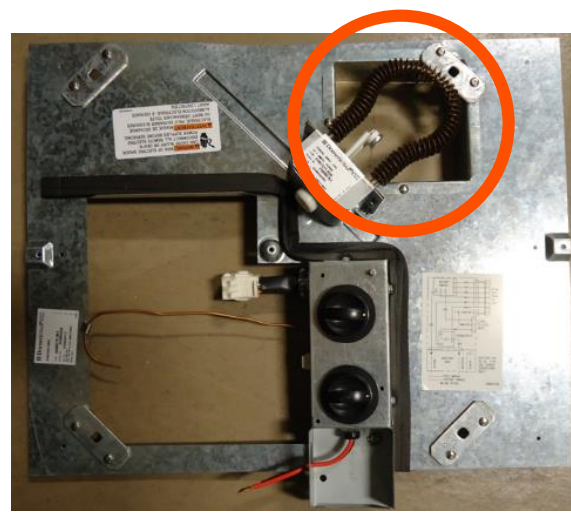
Center Discharge Air
Delivery System

Template Installation

Some OEMs will cut the return and discharge holes directly into the roof instead of cutting the full 14" x 14" hole. If you are replacing a Brisk I on a unit with this type of installation, you must specify. Brisk II will not work due to the change in discharge. Units with Brisk I's will have a corner discharge template and will not allow proper air flow on a Brisk II.



Brisk Air



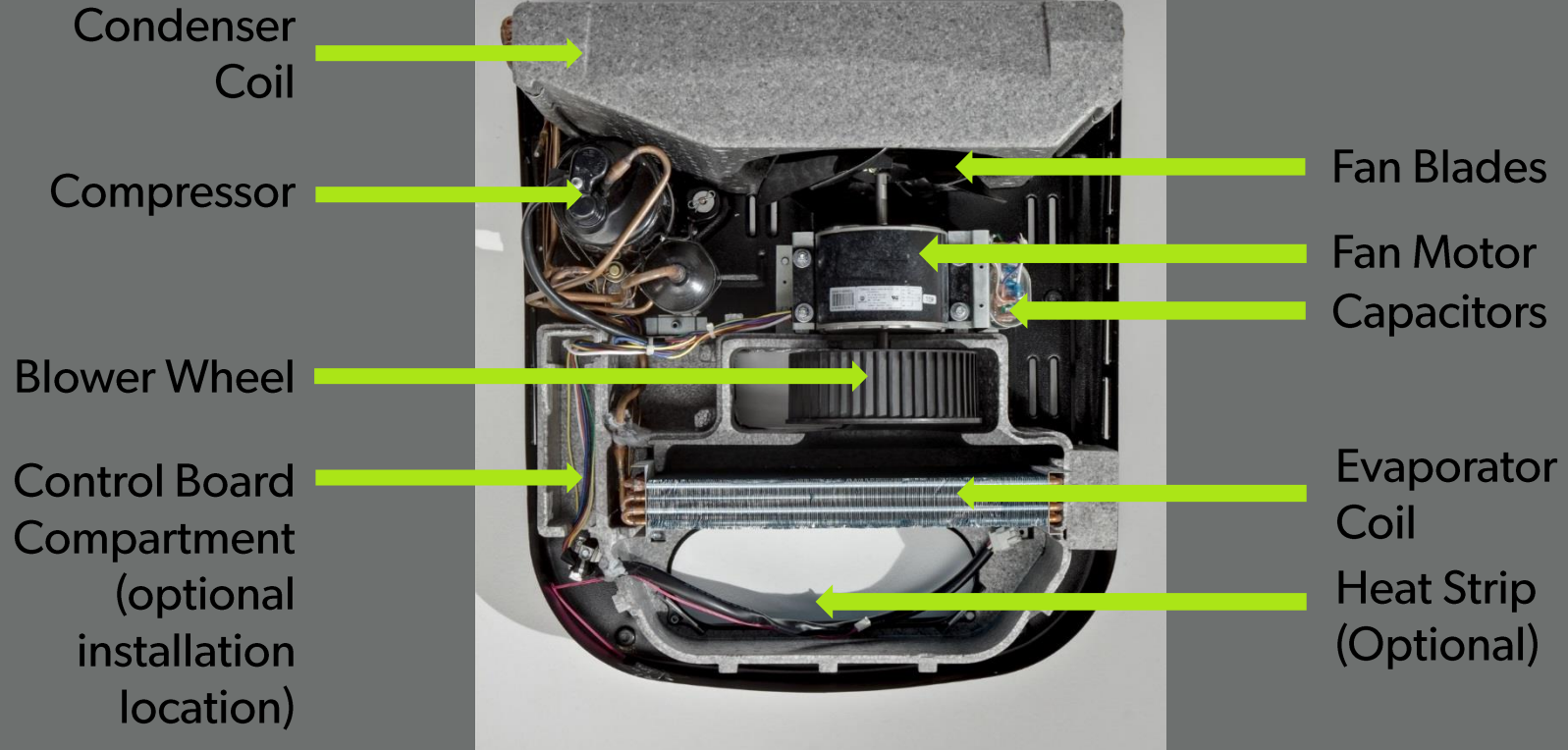
Old Style Heat Strip

Brisk Air II



New Style Heat Strip
(Ducted)

Brisk Air II Layout



Benefits of EPP (Expanded Polypropylene) Foam vs. Sheet Metal



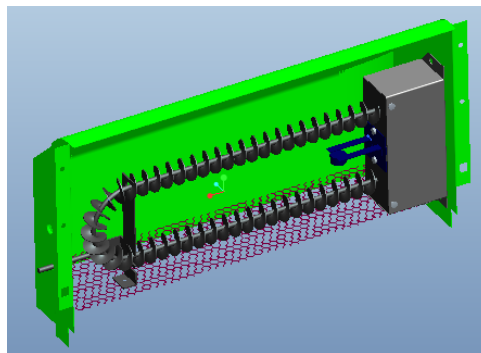
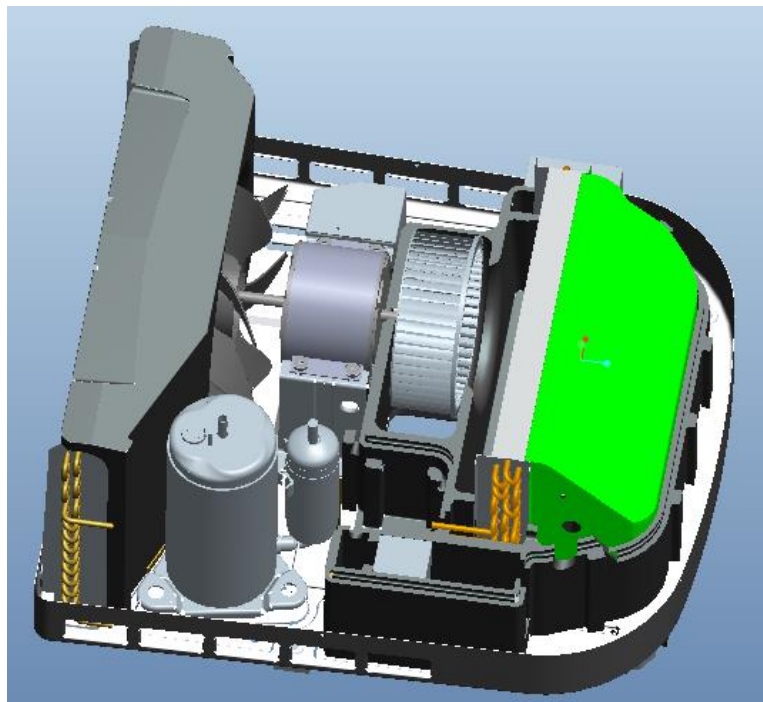
EPP foam makes for better insulation and can be form molded for better airflow throughout the system. EPP foam is able to absorb kinetic impacts very well without breaking, retains its original shape, and exhibits memory form characteristics which allow it to return to its original shape in a short amount of time. Using this style of EPP foam as opposed to sheet metal makes the unit much lighter, making it easier to get onto the roof of the RV.

Benefits of EPP Foam vs. Sheet Metal



Optional Electrical Heater W/Shield

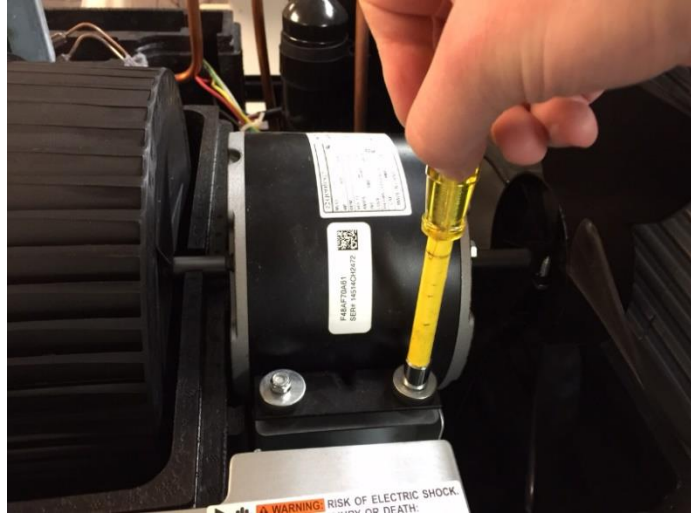
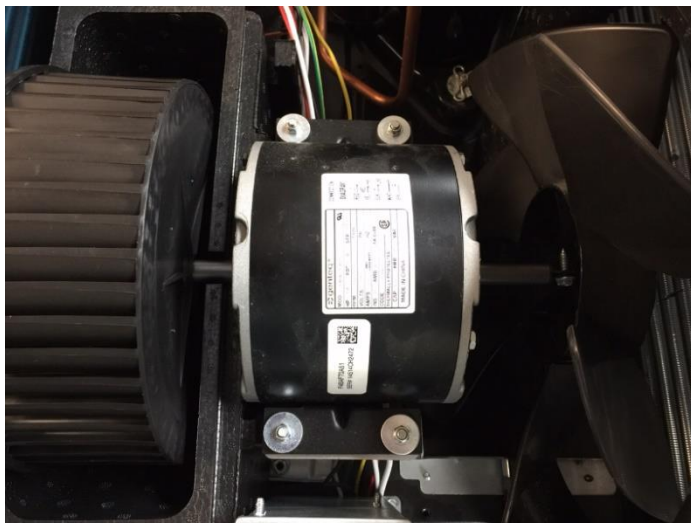
With the unit now using EPP Foam as opposed to sheet metal, the optional Heat Strip has been redesigned for the Brisk II in order to protect the foam housing with a sheet metal casing that shields the heat and protects the foam from damage.



5700 BTU
120 VAC
9.6 OHMS
12.7 AMPS

Motor Bracket

Open access to the four mounting bolts cuts motor replacement time in half. Simply remove the four nuts and washers and you can remove the complete fan motor, blades, and blower wheel assembly as one.



High Performance

(Unit no longer in production – replaced by Blizzard NXT)

High performance air conditioners/heat pumps produce more air flow than the Penguin/Brisk Air's.

350 CFM vs. 335 CFM

- **COOL ONLY**
- **HEATPUMP**
- 13,500 BTU
- 15,000 BTU



Blizzard NXT

Like the High Performance unit before it, the Blizzard units produce more airflow than the Penguin/Brisk units.

350 CFM vs. 335 CFM

- **COOL ONLY**
- **HEATPUMP**
- 13,500 BTU
- 15,000 BTU



Unit was designed to be mounted from the top but can be mounted traditionally from the bottom as well.

Penguin II Low Profile

- **COOL ONLY**
- **HEATPUMP**
- High Capacity
- 13,500 BTU
- 11,000 BTU
- Pre-installed heat strip option
- Pre-installed controls option



10.5" Height

Air Command

- **COOL ONLY**
- **HEAT PUMP**
- 13,500 BTU
- 15,000 BTU



Data Tag/Sticker

1. Model/Mfg #

2. Serial #

3. Product #

DOMETIC

No. 18 jinhua Lu, Sanzao,
Jinwan Zhuhai, China
Zip Code 519041

Assembled in CHINA

115VAC 60Hz
Outdoor Use

MFG#	SERIAL NO.	PROD. NO.	SKU#
B59516.711C0	71422391	936002216	9105304464
REFRIG. -----0Z R410A 18.4	NOM. BTU 15,000	RLA COOL 13.2	RLA HEAT —
			LRA 70.0
			FAN FL 2.7

AIR CONDITIONER IS CERTIFIED FOR USE WITH:

- [] 3314851
- [] 3314850
- [] 3107541
- [] 3109226
- [] 3312020
- [] 3310935
- [] 3315450 HEATER KIT
- [] 3314998 HEATER KIT

HEATER WATTS (@ 120V)
1530

MAX. CIR. PROTECTION 2
MIN. CIR. 20.0

T.D. FUSE OR CIRCUIT BR
MOTOR COMPRESSOR TH

DESIGN PRESS./FACTORY
250 PSI LO SIDE; 500 PSI

MARK
AFTER
INSTALL



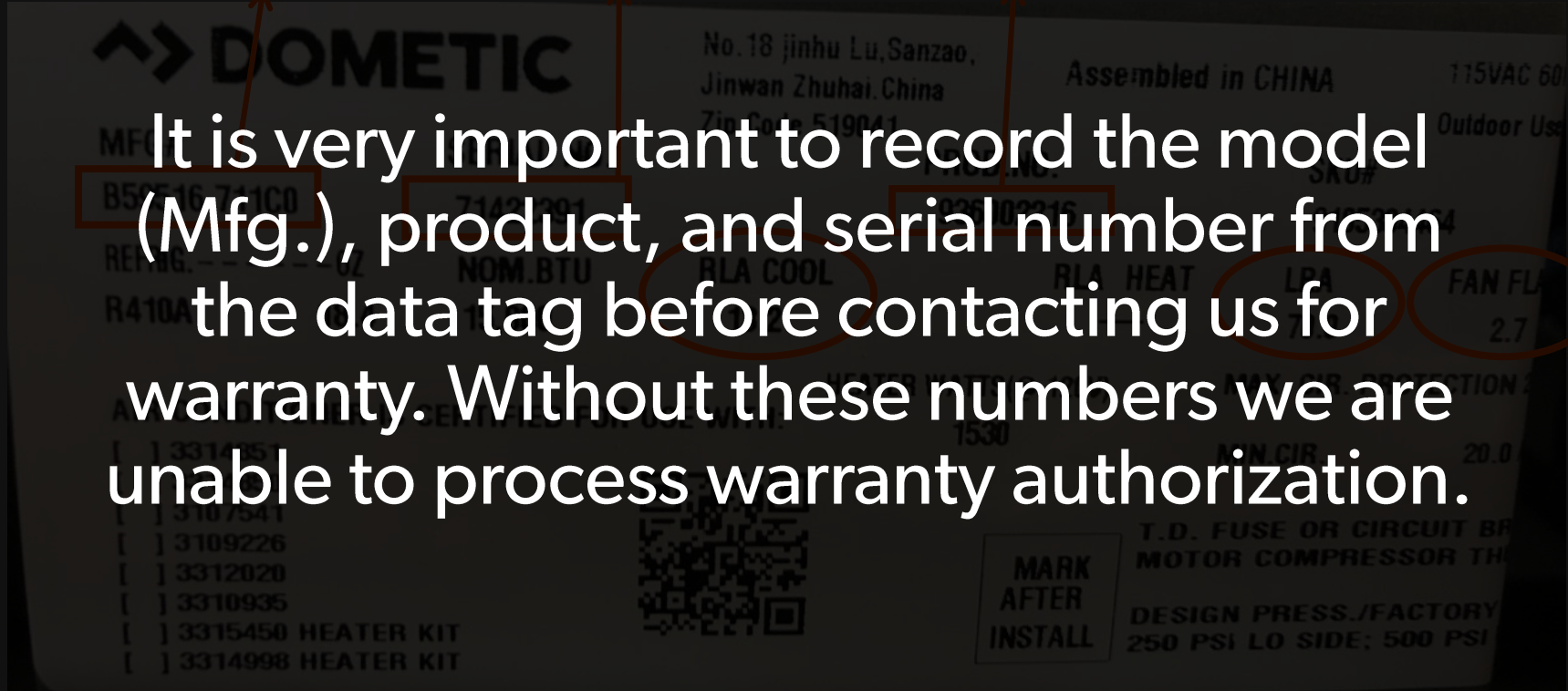
Data Tag/Sticker

1. Model/Mfg #

2. Serial #

3. Product #

It is very important to record the model (Mfg.), product, and serial number from the data tag before contacting us for warranty. Without these numbers we are unable to process warranty authorization.



Mechanical Air Distribution Box

Universal to all systems new and old



Old Style Manual ADB - will not work with New Brisk II due to discharge location



Air Distribution Box

Non-Mechanical for Non-Ducted Wall Thermostat Applications



Quick Cool Vent for Ducted Systems



1st Generation

The Quick Cool vent is for ducted systems that diverts the airflow from the ducts and dumps it straight down onto your head for a refreshing shower of cool air so you can cool down quickly.



2nd Generation

Lowest profile in the industry, leaving plenty of headroom inside the RV. Sliding functions for filter are easier to use and quicker to access than previous generation. (Part Num: 3315930.010)

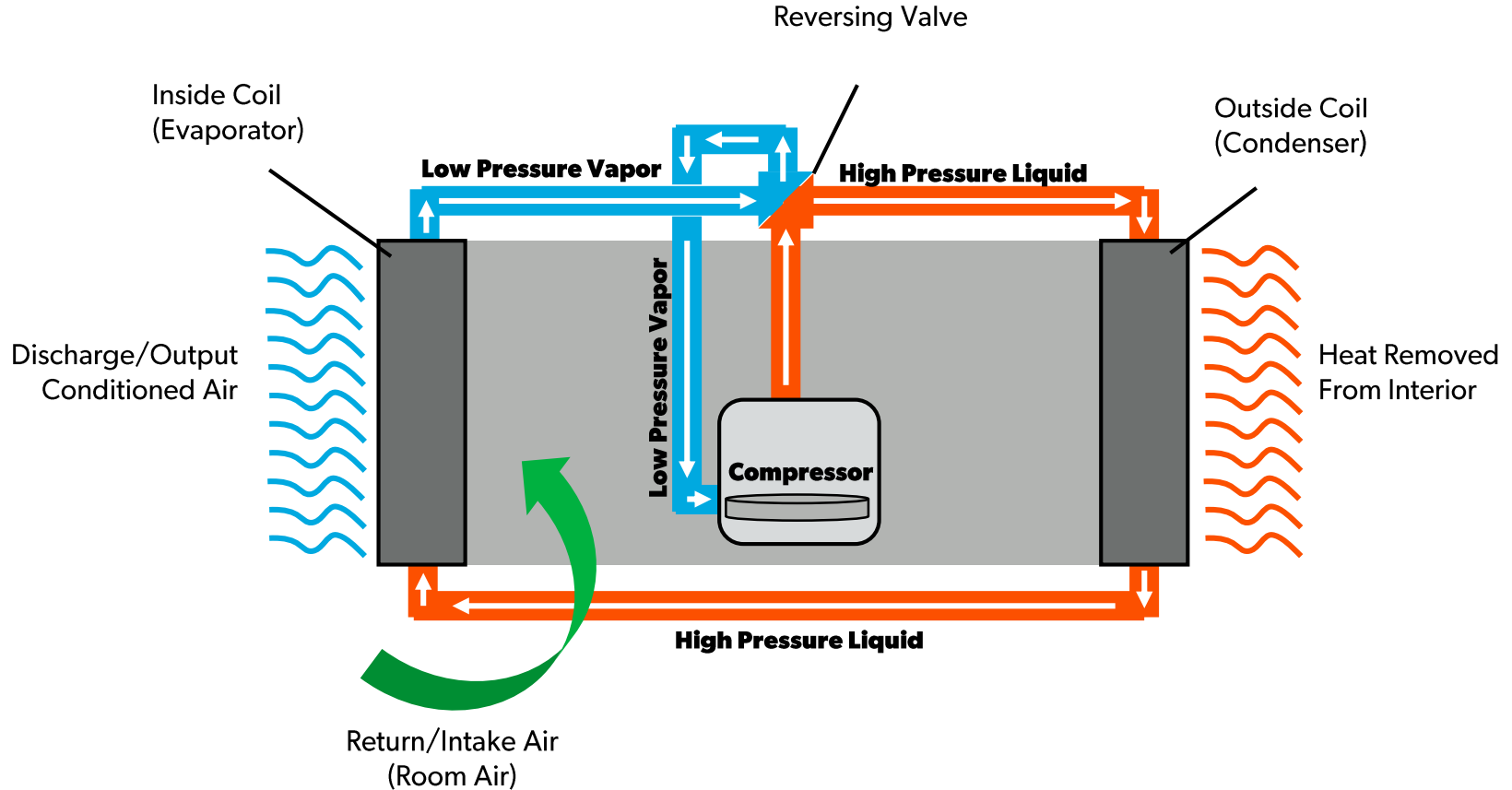
Air Conditioners and Heat Pumps Control the interior climate by a Heat Transfer. By removing the heat from the interior air of the RV we are left with cold air.

-Temperature and Pressure go Hand in Hand-

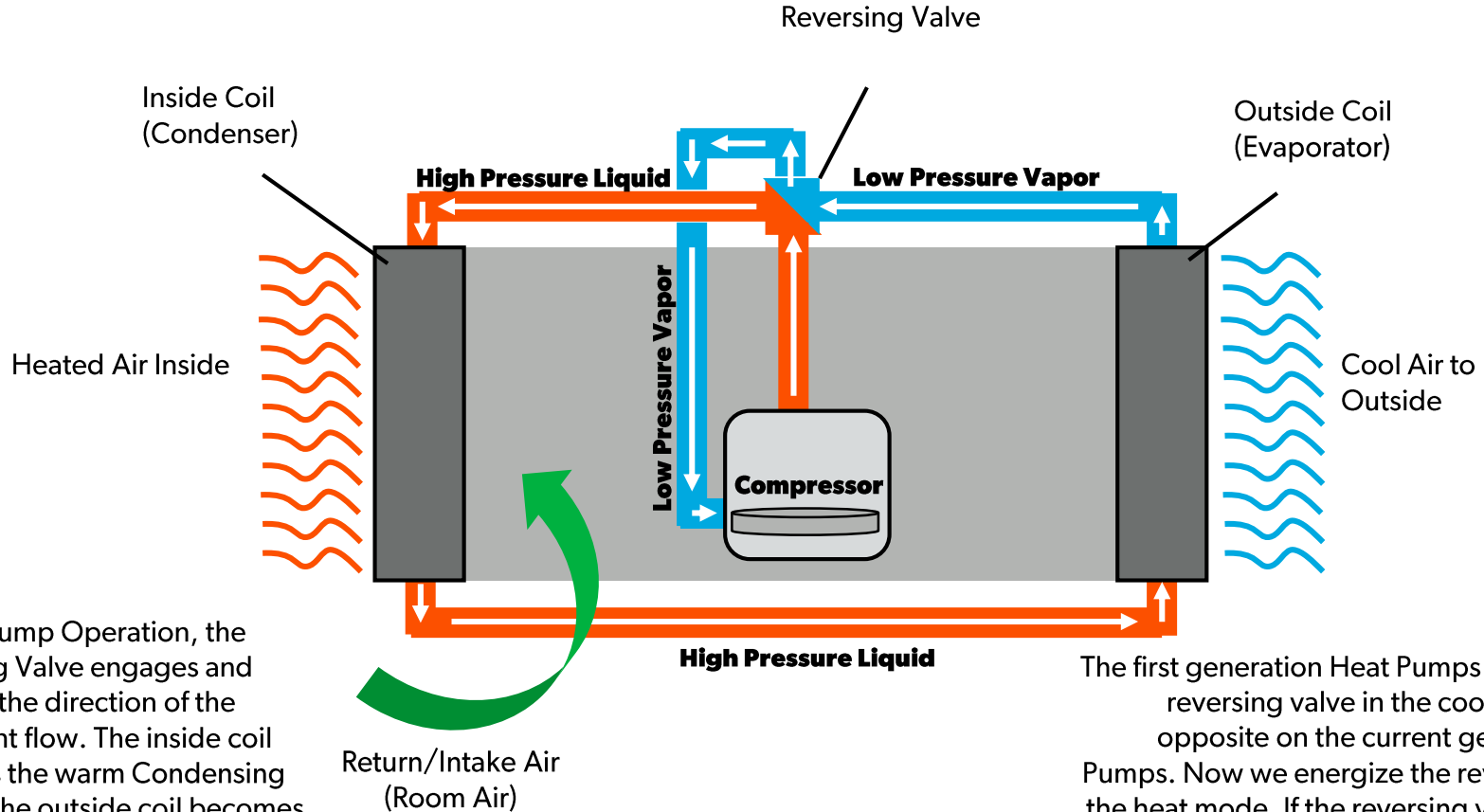
By controlling pressures, we control the temperatures.

Temperature Degrees F	R22 Pressure (PSIG)	R410 Pressure (PSIG)	Temperature Degrees F	R22 Pressure (PSIG)	R410 Pressure (PSIG)
15	38	70	80	144	235
20	43	78	85	156	254
25	49	87	90	168	274
30	55	97	95	182	295
35	62	107	100	196	317
40	69	118	105	211	340
45	76	130	110	226	364
50	84	142	115	243	390
55	93	155	120	260	417
60	102	170	125	278	446
65	111	185	130	297	476
70	121	200	135	317	507
75	132	217	140	337	540

Air Conditioning Cycle



Heat Pump Cycle



In Heat Pump Operation, the Reversing Valve engages and changes the direction of the refrigerant flow. The inside coil becomes the warm Condensing coil and the outside coil becomes the cold Evaporator coil.

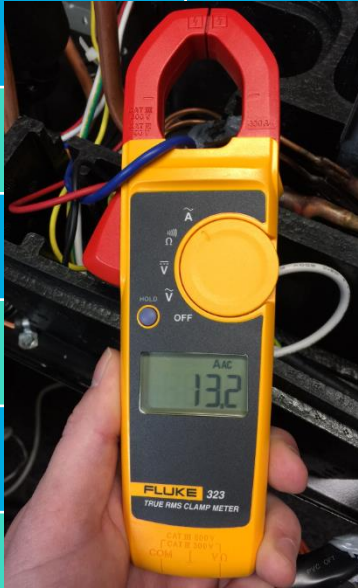
The first generation Heat Pumps energized the reversing valve in the cool mode. This is opposite on the current generation Heat Pumps. Now we energize the reversing valve in the heat mode. If the reversing valve becomes stuck or defective, the unit defaults to cool

Amp Draw Per Temperature

(Using the data tag RLA [Rated Load Amps] number from the previous slide as an example – RLA numbers will vary from model to model)

Design specifications of all air conditioners, 95 degrees at AC (outdoor coil), 80 degrees inside, 50% humidity and exactly 115 Volt AC

Compressor Amps (BLUE wire)	Temperature at AC Outdoor Coil
11.2 Amps	75 Degrees
12.2 Amps	85 Degrees
13.2 Amps	95 Degrees
14.2 Amps	105 Degrees
15.2 Amps	115 Degrees
16.2 Amps	125 Degrees



General rule of thumb - the compressor amp draw will change (1) amp for every 10 degree change from design specifications.

Degree Split (Differential)

A simple test to see if the unit is operating to industry standards

NOTE: Get these readings directly at the AC unit, not further down the duct runs.

RETURN AIR
-Warm Air
entering A/C



DISCHARGE
-Cold Air pushed
out of the A/C

- Look for an 18-20 degree split
- Must be 70°F or warmer
- Take Humidity into consideration
- Higher Humidity = Less Split
- Low Humidity = More Split

Degree Split (Differential)

A simple test to see if the unit is operating to industry standards

There are four readings you will need for warranty authorization if an AC is not cooling:

- Amp Draw from Compressor (blue wire)
 - Outside Ambient air temp on the roof
 - Intake/Return Air Temperature
 - Output/Discharge Air Temperature
- Look for an 18-20 degree split
 - Must be 70°F or warmer
 - Take Humidity into consideration
 - Higher Humidity = Less Split
 - Low Humidity = More Split

RETURN AIR
- Warm Air
entering A/C

DISCHARGE
- Cold Air pushed
out of the A/C

AC can't keep the RV cool?

On complaints of the AC not cooling the RV, even with a good temp split between the return and discharge, be sure to verify installation of the AC unit and insulation of the coach. Also, verify if there is enough AC for the size of the RV (are additional AC units needed?).

The open space between the roof and ceiling should be closed off around the ducting.



Excessive Heat Gain

Curtains/Drapes/Shades/Windows/Doors

The ability of the air conditioner to maintain the desired inside temperature depends on the heat gain of the RV.

Some preventative measures taken by the occupants of the RV can reduce the heat gain and improve the performance of the air conditioner. During extremely high outdoor temperatures, the heat gain of the vehicle may be reduced by:

1. Parking the RV in a shaded area
2. Using window shades (blinds and/or curtains)
3. Keeping windows and doors shut or minimizing usage
4. Avoiding prolonged use of heat producing appliances

Troubleshooting Freeze-Ups



Loose Cold Cont.

Make sure the Cold Control is located in the correct location and within specifications.



Dirty Coils

Keeping the inside and outside coils clean and clear of dirt, dust, and debris will maintain good airflow throughout.



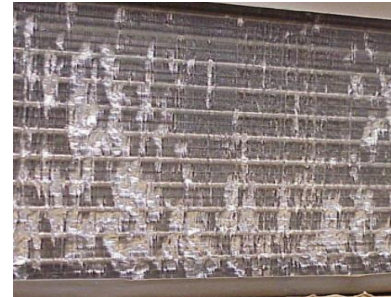
Vents

Be sure that vents remain open and clear. Closing vents off will reduce air flow and eventually cause a freeze up.



Ducts

Blocked or pinched duct work will also cause a restriction in airflow and overtime cause freeze ups. A minimum of 4 exhaust ducts off each AC



Damaged Coils

If fins become damaged they will cause a restriction and limit airflow over the coils, in turn, causing a freeze up.



Recirculating Air

A recirculation of air between the return and discharge (air leak) will allow, over time, the air to become super charged cool air.

Freeze-Ups Continued

A low charge on the compressor (low amp draw) or loss of refrigerant can cause the unit to freeze up.

Note: It is rare that a freeze up is occurring because of a low charge on the compressor.

Take time into consideration. If a freeze up happens within the first 15-20 mins. of compressor startup, it is possible there is a low charge on the compressor. If it takes longer (1- 4 hours), there is either a recirculation of cold air between the return and discharge or there is a lack of air flow throughout the system (dirty filters, damaged coils, blocked vents/ducts, ect...)

Cold Control (Freeze Sensor)

If the freeze control sensor is not installed properly or not working within specifications, there is a high chance the unit can freeze up. If installed properly however and working within specs., the sensor will send a signal to the control board to shut the compressor down and run the fan on high speed to defrost the coils and compressor lines.

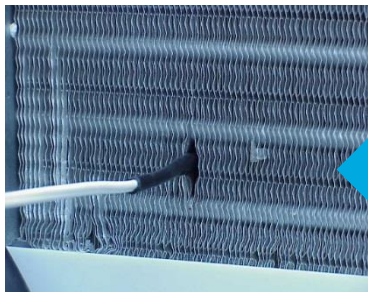
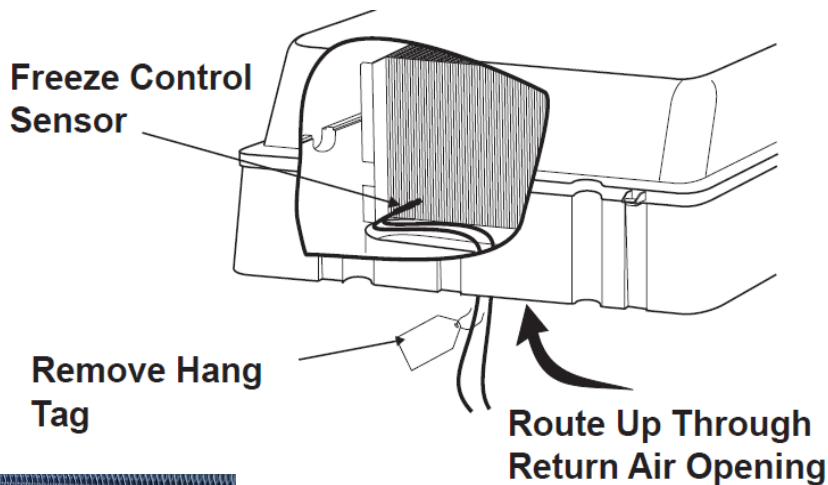


Cold Control (Freeze Sensor)

Low Temp Protection Device (Thermistor Style)

used with all digital thermostats

P/N 3312303.005



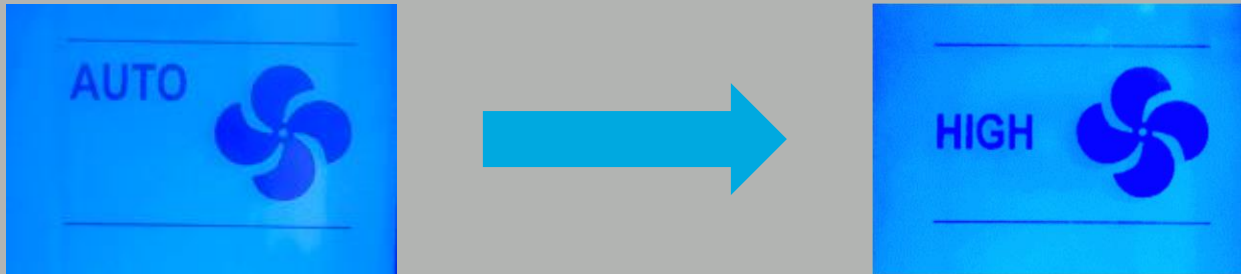
Installation Location: No more than two coils up from the bottom and positioned either in the center or left hand side.

Testing: While the sensor tip is installed in the fin, check each wire for a short to ground to verify if sensor is shorted.

Temp	Ohms
25° F	27271
30° F	23528
35° F	20348
40° F	17642
45° F	15334
50° F	13360
55° F	11667
60° F	10212
65° F	8959
70° F	7876
75° F	6939
80° F	6126
85° F	5418
90° F	4802
95° F	4264
100° F	3793

Freeze-Ups Continued

Make sure to ask the customer if the freeze-ups are happening at night (i.e., when temperatures are around 60°F). In this case have the customer run the fan speed in HIGH as opposed to AUTO.



At night, when the outside temps are lower, the difference between the inside temp and the set point of the T-stat may be so close that in AUTO Fan speed, the unit could run in "Low" all night long, minimizing air flow over the coils for an extended amount of time. Mix this with the higher humidity levels at night time and these are prime conditions for a freeze up.

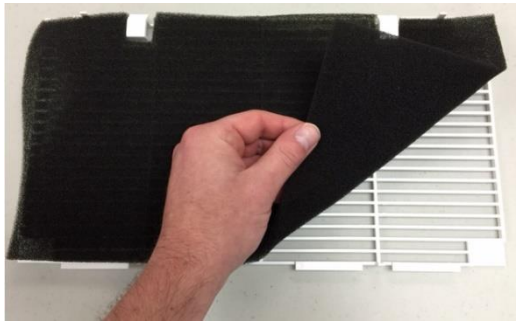
Drain Pan (Port) and Negative Pressures

Upon complaints of water dripping into the RV from the Return Air Grille we need to verify there is not a blockage or lack of Return Air trying to make it into the AC system.

If the air conditioner is experiencing restricted air flow and is starving for air it will look for that air in any location it can - which usually means that the oxygen will be brought in through the drain holes/ports instead of allowing the condensation to drain out onto the roof like normal. If a negative pressure zone is created and the air shuts off, the pressure is released which allows water to run into the coach through the ADB (Air distribution box) or Return Air Grille.

To test: Remove the filter and grille to allow maximum airflow which should correct the negative pressure and allow condensation to drain accordingly. Or, with the grille and filter assembled, fold a piece of paper in half and place at the filter. It should hold in place. If within 10 mins. or less the paper falls, the unit has a negative pressure issue.

This will usually be caused by dirty filters or fallen/loose foam/metal tape.



AC Tripping Breakers?

- Air conditioners are 115 VAC, 60 Hz appliances. The proper operating range is 103.5 VAC to 126.5 VAC.
- Low AC voltage causes the compressor to work harder, in turn, increasing amperage and possibly tripping the breaker.
- Many times a customer's complaints cannot be duplicated at the shop due to proper power supply and power cords that you use within your facility.
- On complaints of high amps or tripping of the breaker, try to test the A/C with the customers equipment.
- Also take outside temperature into consideration. Remember, higher outside temps add more draw on the amps.



Start Capacitor & Run Capacitor

Capacitors rarely fail and if they do there is normally visual evidence of the failure (I.E. popping open or melting).

Start Capacitor



Not all AC units come with start capacitors. If the customer plans on using a generator, they will most likely need a start cap.

Run/Fan Capacitor



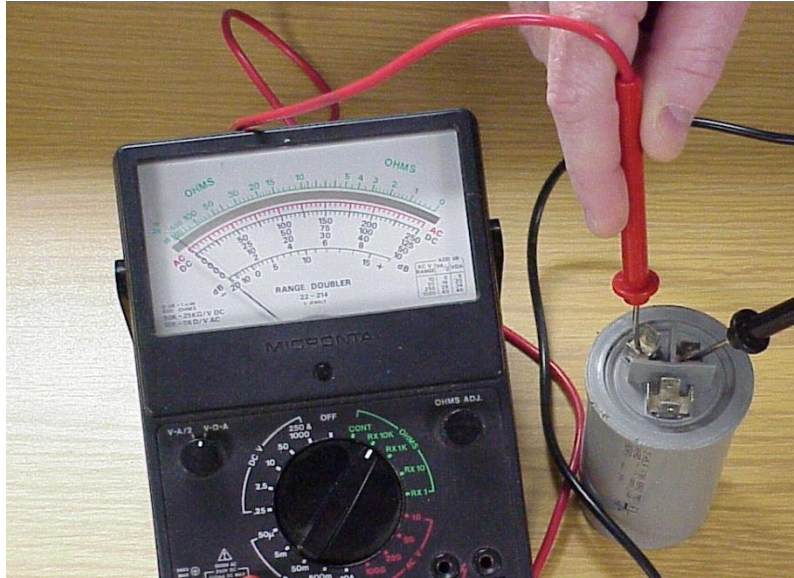
Run Capacitors must be the correct microfarads for the specific fan motor in order to maintain the proper phase in the motor. If the motor runs too long on the wrong phase it will work harder, get hot, and eventually fail.

Symptoms

Start Cap Defective: If the unit fails to start while using the generator as the AC voltage source, verify start cap is good.

Run Cap Defective or Wrong: The fan will either not start at all, run hard, create high amps, or overload if the Run cap is defective.

Fan & Start Capacitors



WARNING:
Capacitors are rated at
370 Volts AC.

1. Discharge Capacitors
2. Check continuity with analog meter or Microfarad's with a digital meter.



PTCR – Brisk Only



PTCR – Any A/C



PN: 3310731.009

PTCR Device

(Positive Temperature Coefficient Resistor)

PTCR (Positive Temperature Coefficient Resistor) is the device that absorbs Start-Up amperage. Start up amps are roughly 1/2 – 2/3 of LRA (Locked Rotor Amps) located on the AC data tag. If the AC unit trips the breaker immediately upon compressor start up, verify the PTCR is not defective.

Visually, the unit will look burned or popped if defective.

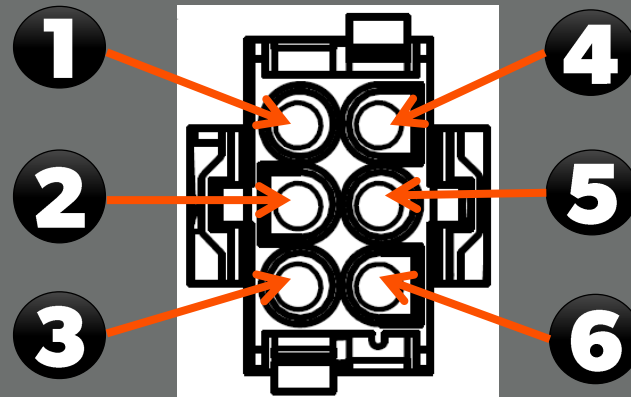


Start Capacitor with PTCR attached

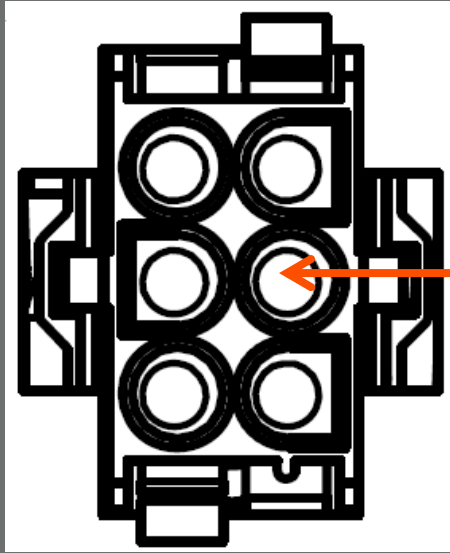


6 Pin Out From AC to Control Box

- Terminal 1 **BLUE** Compressor
- Terminal 2 **BLACK** High Fan
- Terminal 3 **YELLOW** Medium Fan
(or Heat Pump Rev Valve CCC/Analog)
- Terminal 4 **RED** Low Fan
- Terminal 5 **WHITE** Neutral
- Terminal 6 **GREEN/YELLOW** Ground
(Ground is sometimes **GREY**)



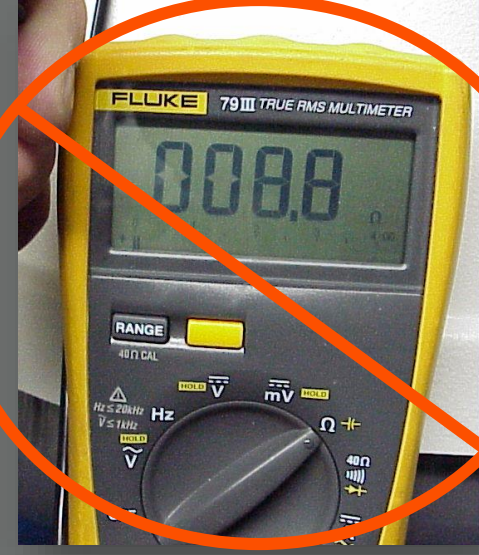
Verify Circuits Are Being Completed Through Controls



Using a 115 Volt AC incandescent bulb, check from terminal 5 -- (**WHITE** - Neutral) to other terminals to determine if a particular circuit is being completed.



An incandescent light bulb is used as a test tool to verify the circuit is completed as this will prove that a load is present.



Never use a volt meter when checking a completed circuit. Many digital meters will show phantom voltage across the terminals.

WHITE > BLUE (Compressor), WHITE > RED (Low), WHITE > BLACK (High), WHITE > YELLOW (Med)

Blower Motor

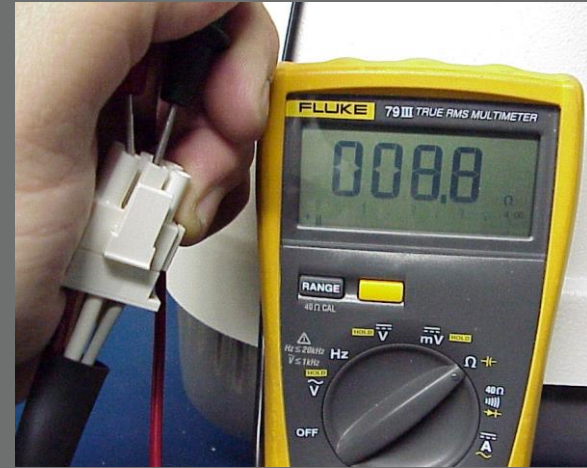
Disconnect Motor Leads

To check for open windings:

1. Set meter to Ohms
2. Check continuity between the **White** Neutral, and each Fan Speed. (**Black, Yellow, Red**).
3. You SHOULD have continuity.

To check for a short to ground:

1. Set meter to Ohms
2. Check continuity between the **Green/Yellow** or Ground to each Fan Speed (**Black, Yellow, Red**).
3. There should NOT be continuity.



Compressor/Fan Bypass Test

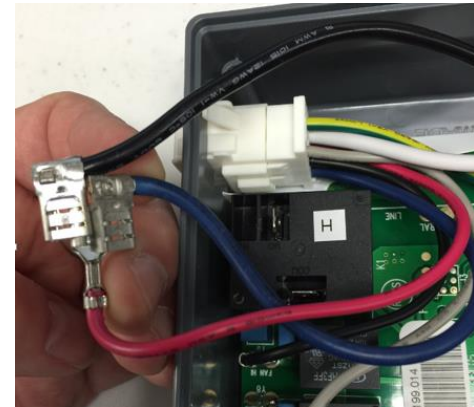
(Using the CT/SZLCD Control box wiring as an example)

Upon complaints or situations where either the compressor or specific fan speeds (High, Medium, or Low) will not turn and run in normal operation or in Diagnosis Mode, we must jump those wires with straight 120V and bypass the relays on the control board. This will prove if the issue lies within the AC unit or the control board/box.

To test – shut the AC breaker down. Go to the control board of the AC having the issue and unplug the BLUE (Compressor) and 120V (BLACK) from the large K1 relay. Choose one of the fan speeds (BLACK or RED), NOT both, and unplug it from the board as well. Now tie all three of these wires together (120V, Compressor, Fan), flip the breaker back on.

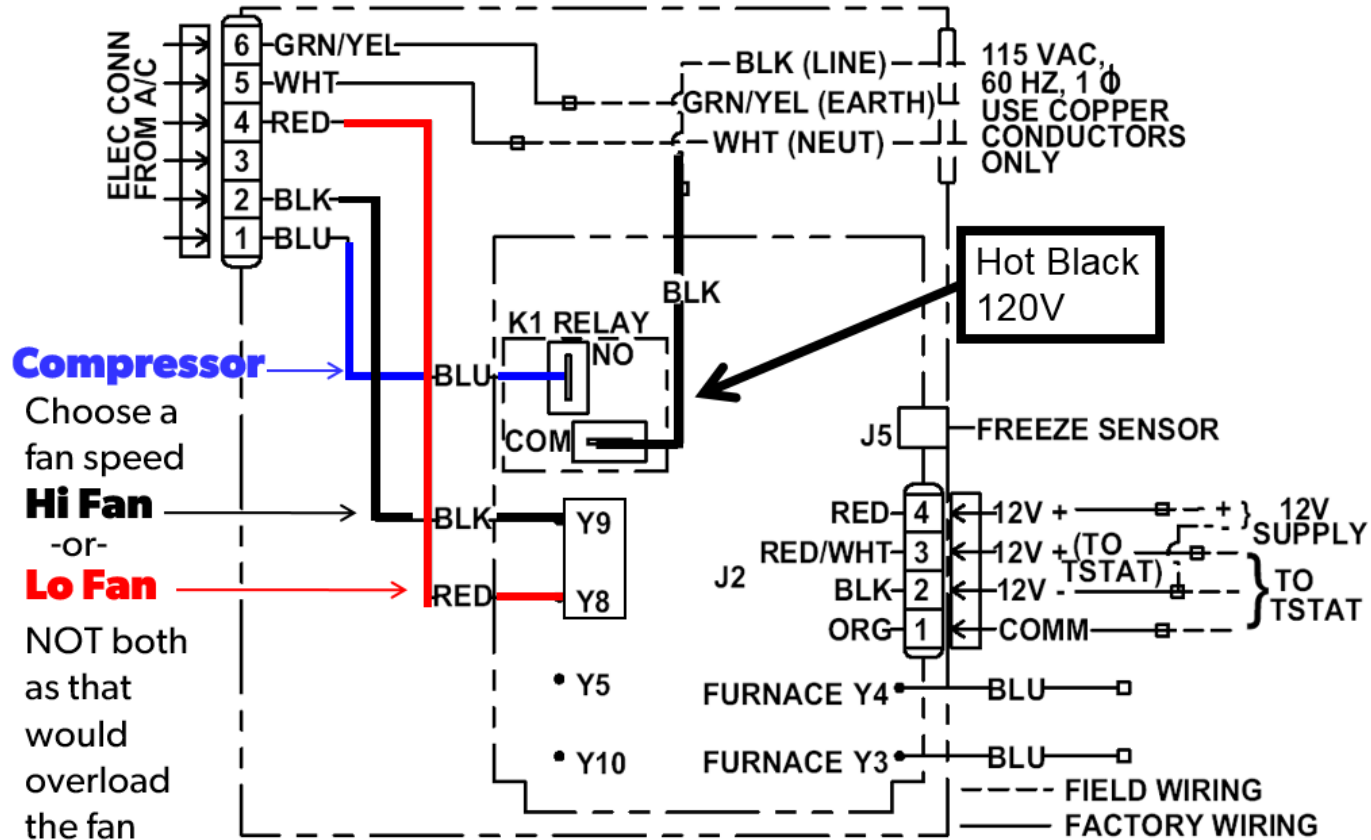
The compressor and fan should start up as soon as the breaker is flipped on. If you still do not have operation of the component in question then most likely that part of the AC unit has failed as long as there is a good supply of 120V power present.

If the AC compressor and fan are now running, this proves the issue is with the control board relay and the control board will need to be replaced.



Compressor/Fan Bypass Test

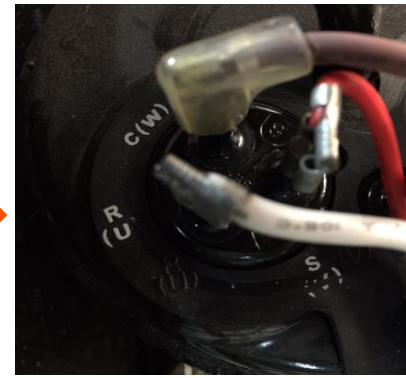
(Using the CT/SZLCD Control box wiring as an example)



Compressor

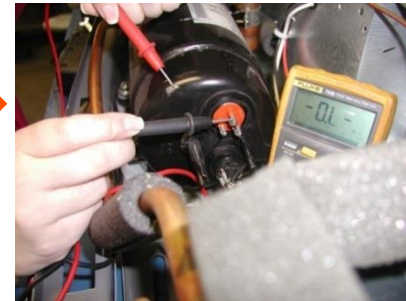
To check for open windings:

1. Disconnect all power and turn all switches to the "OFF" position.
2. Disconnect 3 leads going to compressor (C, R, S).
3. Check for continuity between all terminals.
4. There SHOULD be continuity.

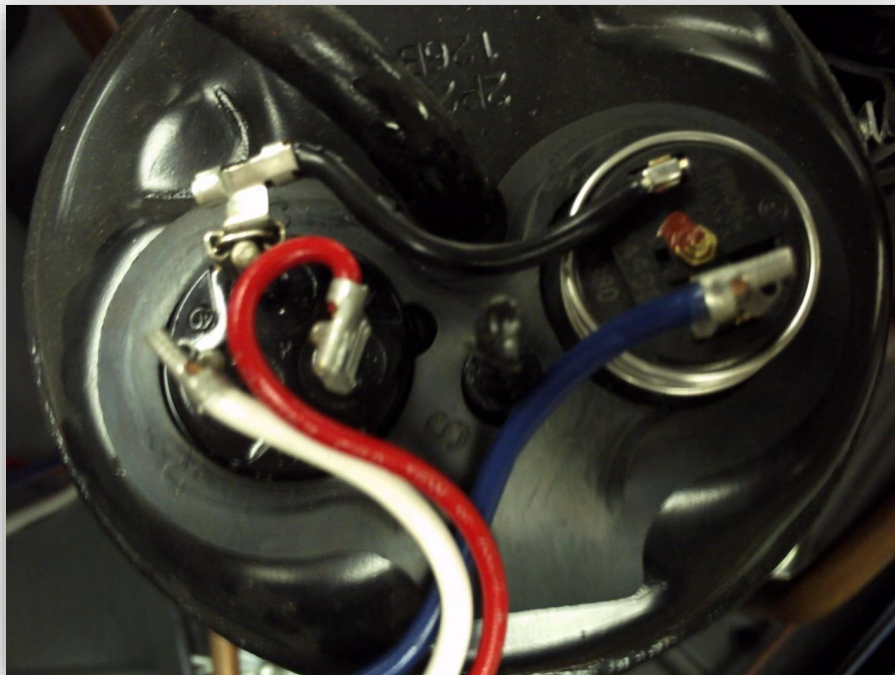


To check for short to case:

1. Same as above, but to the case of compressor.
2. You should NOT have continuity.
 - Scrape paint from compressor in order to make a connection to case.



Overload Protector



NOTE: On some units the overload is an internal component of the compressor and is non-replaceable, refer to parts list to see if the part is replaceable.

Protects the AC from overheating to a point of damaging itself. If defective, it will not allow the compressor to engage.

Use an ohmmeter to check for continuity through the overload device.

If no continuity is found and the compressor is hot, allow 15 to 20 minutes for the compressor to cool.

If a repeat of this test still shows the overload to be open, it is defective and requires replacement.

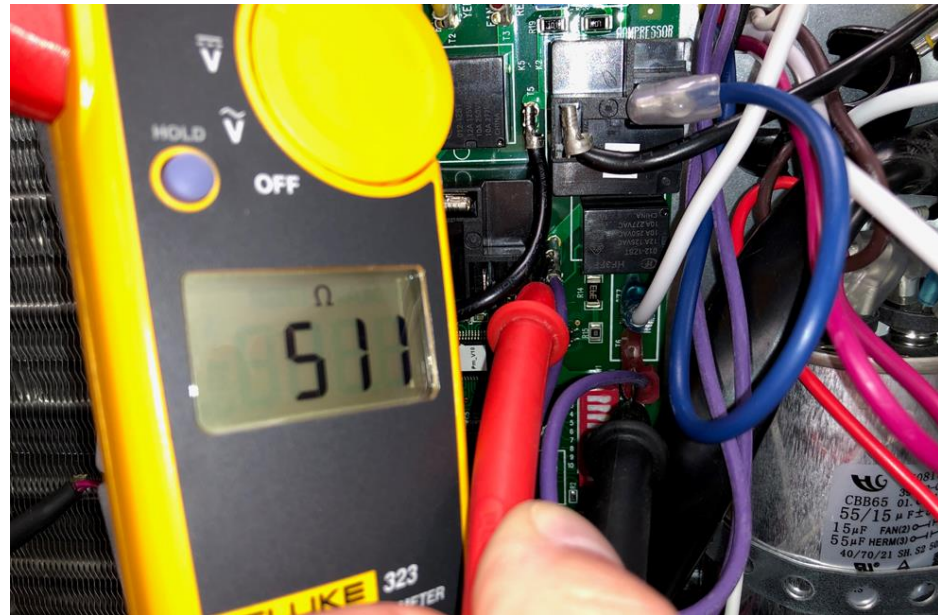
Heat Pump Reversing Valve

The reversing valve is the heart of a heat pump. It changes the direction of the refrigerant flow through the coils, and changes the system from cooling to heating and vice versa.



Only used on a heat pump – Not a replaceable part as it is part of the sealed system. The Valve is solenoid controlled however which can be replaced if it becomes defective.

Reversing Valve Solenoid Coil

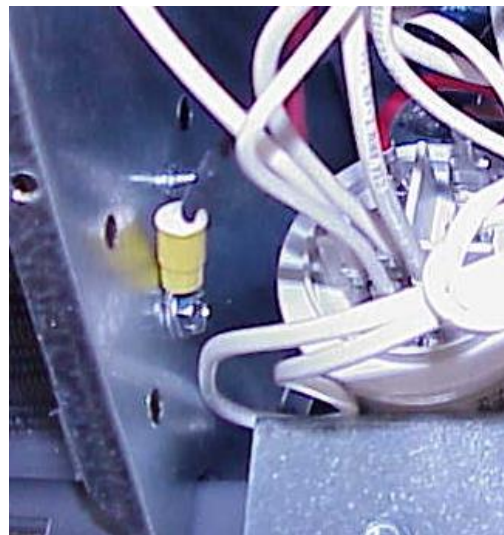


Several different Solenoid Coils have been used with our Heat Pumps over the years. When testing the coil, you should see between 200-600 ohms between the two violet wires. The coil will normally read open if it becomes defective. Always refer to ohms law if looking for a more precise measurement, always +/- 10%.

Heat Pump Outdoor Ambient Sensor

All Heat Pumps use an Outdoor Temperature Sensor. This is to monitor if the outside temp is getting too cold to run the unit and have the proper transfer of heat.

- Analog and Mechanical controlled units will operate down to 40 degrees F.
- Digital controlled units (SZLCD, CCC, CCC2, & CT) will operate down to 30 degrees F. These units cycle into a "Defrost Mode" that will cycle the fan off and flip the coils back into AC mode. Defrost mode will happen between 30 – 42 degrees F. The unit may run like this for approx. 2 mins. and repeat every 25 mins.
- Air Command Defrost Mode happens between 50-59 degree ambient temp, lasts roughly 5-10 mins, and resumes normal operation once the coil reaches 90 F. Furnace mode will take over automatically as the Heat Pump Locks out at approx. 45 F.



This is NOT a Ground



CCC 5 Button

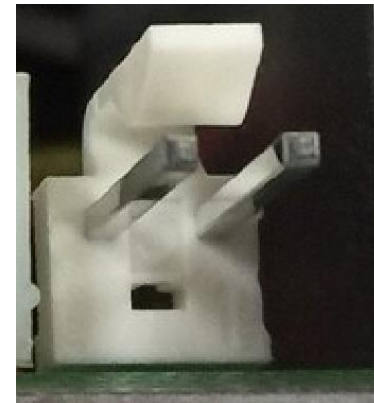
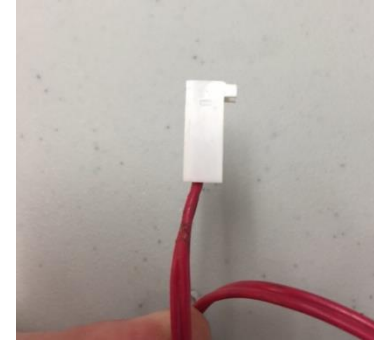


SZLCD/ CCC2/ CT

SZLCD/CT/CCC2 Heat Pump Outdoor Ambient Temp Sensor

Normally a thermistor that is defective will read open or very high ohms resistance. Temp sensors partially grounded will change the ohms value, the control will read open.

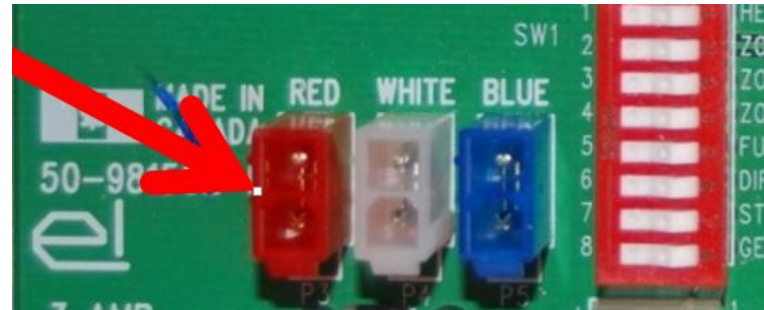
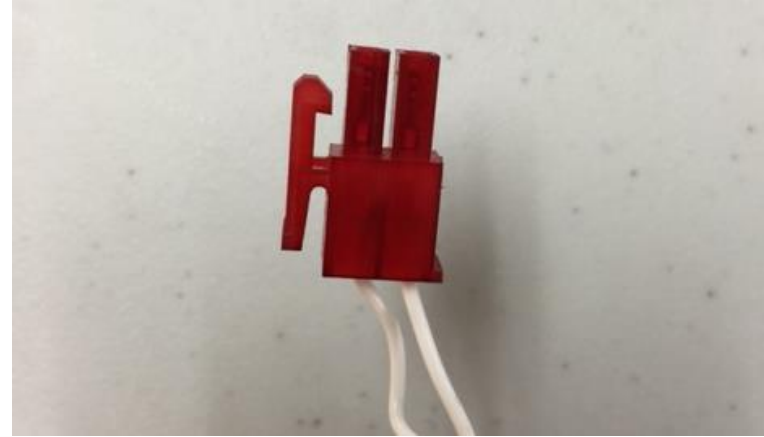
Temp F	Temp C	Ohms
14	-10	43,670
23	-5	34,630
32	0	27,700
40	4	23,270
50	10	18,070
60	16	14,160
70	21	11,650
80	27	9,275
90	32	7,715
100	38	6,229



5 Button CCC Heat Pump Outdoor Ambient Sensor

Normally a thermistor that is defective will read open or very high ohms resistance. Temp sensors partially grounded will change the ohms value, the control will read open.

Temp F	Temp C	Ohms
35°	1.7	20,348
40°	4.5	17,642
45°	7.2	15,334
50°	10	13,360
55°	12.8	11,667
60°	15.5	10,212
65°	18.3	8,959
70°	21.1	7,876
75°	23.9	6,939
80°	26.7	6,126
85°	29.5	5,418



Analog & Mechanical

Heat Pump Out Door Temperature Sensor

To Test a Change-Over Thermostat

1. Verify temperature at capillary tube.
2. If temperatures are above 45° F, continuity SHOULD be between terminals 2 and 3 and NOT between 2 and 1 (Marked on the bottom).
3. If temperatures are below 40° F, continuity SHOULD be between terminals 2 and 1 and should NOT be between 2 and 3.



The Change-over thermostat is a capillary tube/bellows-type switch. Its function is to shut the compressor and fan off by opening the neutral side when outside temperatures are 40 degrees +/- 10%.

Heat Pump Troubleshooting

1st Generation Heat Pumps

The Reversing Valve was energized in the Cool Mode. If the reversing valve becomes defective, stuck, or the solenoid coil fails, the unit would run in the Heat Mode only.

2nd Generation Heat Pumps

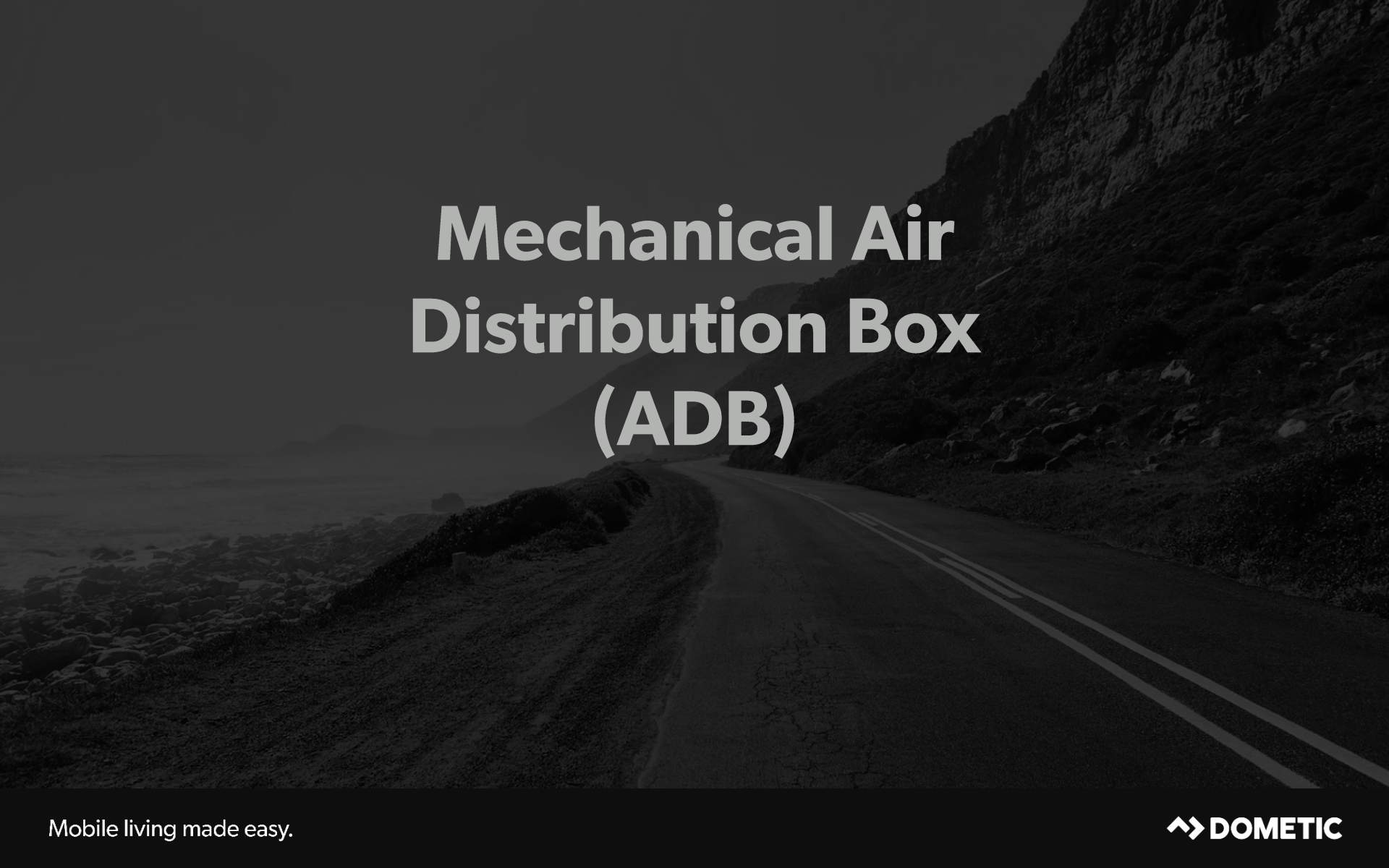
Now, the Reversing Valve is energized in the Heat Mode. This was done incase the Reversing Valve becomes defective, stuck, or the solenoid fails, the unit will default to Cool Mode.

Problem

- Unit running in reverse.
- Reversing Valve will not switch.
- Compressor runs with no Fan (15 mins).
- No Heat Pump operation.

Fix

- Review wiring (SZLCD switch Y5 – Y10).
- Solenoid Coil Possibly defective (Ohms test).
- Review wiring for Conversion (10 button to 5 button).
- Outdoor Ambient Sensor defective/removed (Ohms).



Mechanical Air Distribution Box (ADB)

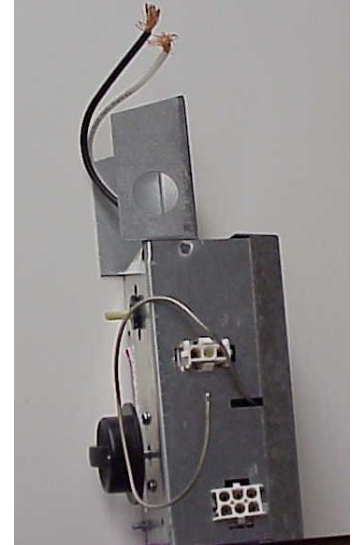
Mobile living made easy.

 **DOMETIC**

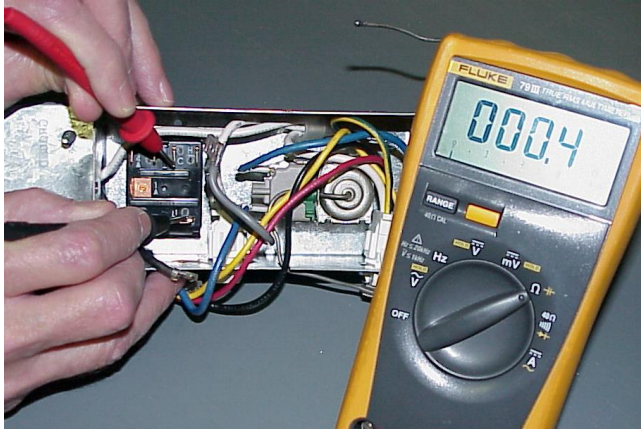
Mechanical Controls



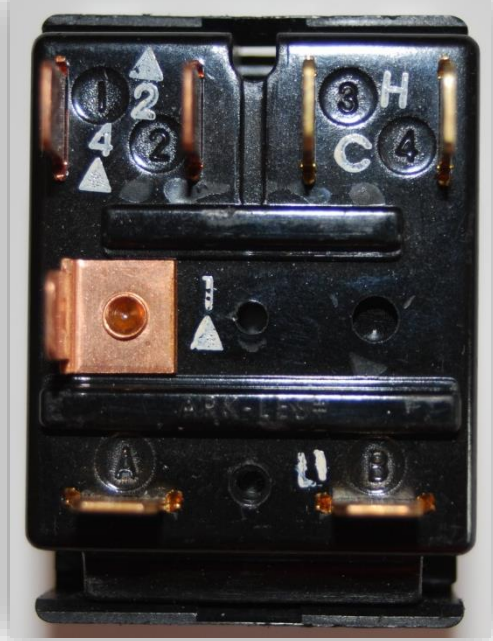
Supplied with
115 VAC



Mechanical Switch Test



- Disconnect/Turn off Coach Power
 - Disconnect wires to isolate switch
- Note:** Mark where wires are located before removing

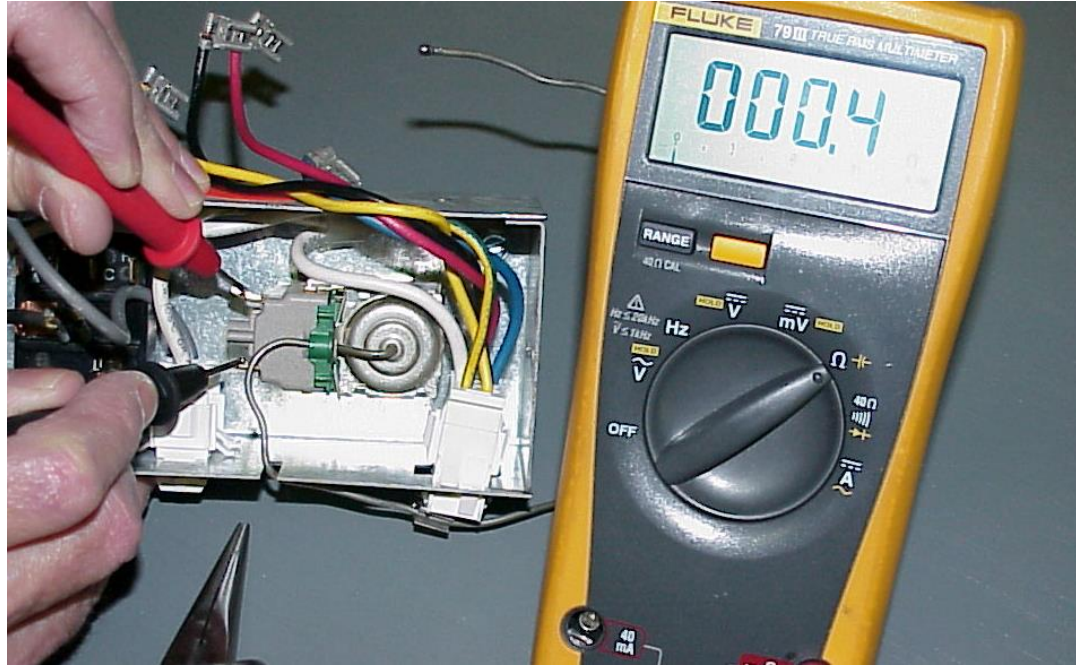


SWITCH SETTING	8-Position
High Cool	L1, C, 1
Med. Cool	L1, C, 2
Low Cool	L1, C, 4
High Heat	NONE *
Med. Heat	NONE *
Low Heat	L1, H., 4
High Fan	L1, 1
Med. Fan	L1, 2
Low Fan	L1, 4

The switch should be checked with an Ohmmeter to determine if continuity exists. Example:
Switch is in High Cool position the Ohmmeter shows continuity between L1, C and 1.

NOTE: Always use the WHITE INK stamp as your reference #.

Mechanical Thermostat



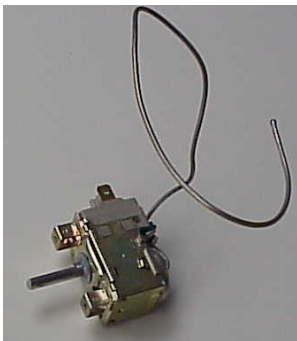
Put the sensing bulb in a glass of Ice Water. This should cause the contact points to OPEN or show NO CONTINUITY.

Mechanical Thermostat – Cool Only

The COOL only thermostat is adjusted so the air conditioner will not start the compressor below 65°F.

Continuity SHOULD show across the terminals when the contact points make a good connection.

The thermostat will not cycle off if the temperature is above 90°F at the sensing bulb and will not cycle on if 65°F or cooler.

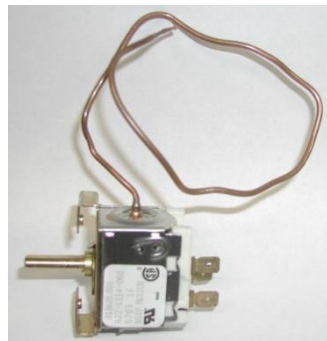


1 Set of
Contacts

Mechanical Thermostat – Cool/Heat

The HEAT/COOL thermostat is very similar to the COOL only thermostat. However, the HEAT/COOL contains 2 sets of contacts.

For example: In 90°F temperatures, the cooling contacts (1 and 2) should be closed and the Heat contacts OPEN (2 and 3). Below 65°F temperatures the opposite will occur.



2 Set of
Contacts



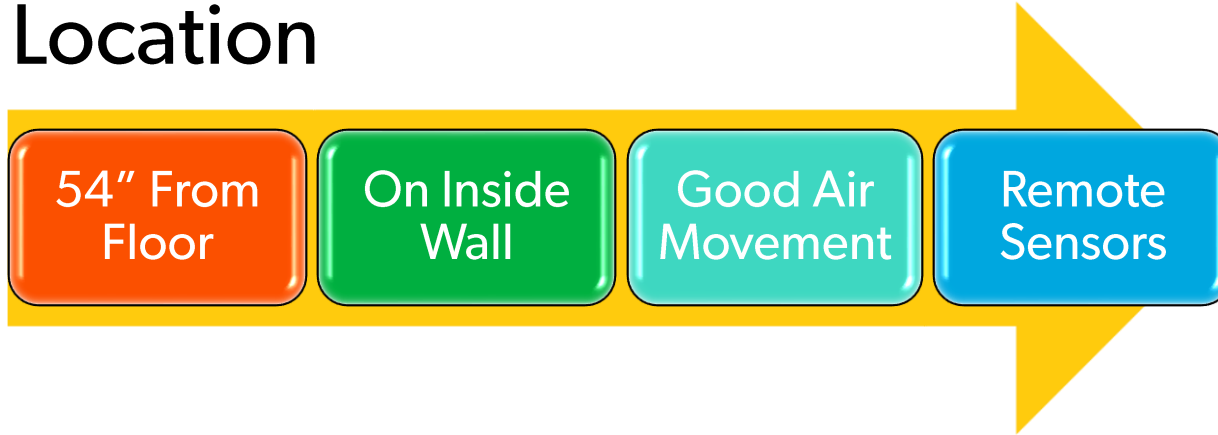
Wall Thermostats

Mobile living made easy.

 **DOMETIC**

Thermostats

Location



Installation of the thermostat and remote sensors in a good location can eliminate short cycling.

Situations of short cycling, or the unit never getting to temp, can be affected by the location of the wall t-sat or remote sensors.

- If the unit is installed on an exterior wall, it may be affected by the heat on that wall, especially when that wall is facing the sun on hot days.
- When the unit is short cycling, turning on and off over a short period of time, it is mostly likely due to a vent or duct blowing air directly onto the t-stat or remote sensor.

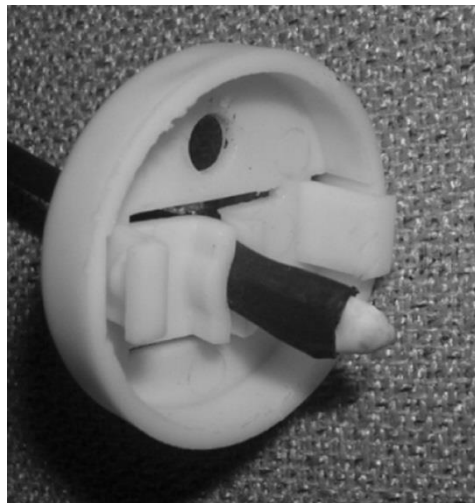
Remote Temperature Sensor

- Used with multi-zone systems (CCC & CCC2) -

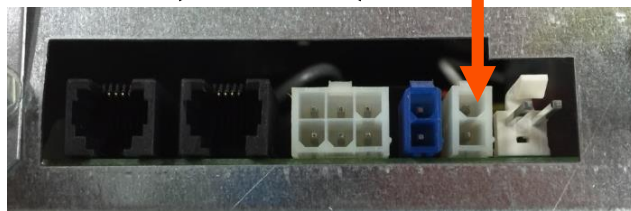


White 2 Pin Connection

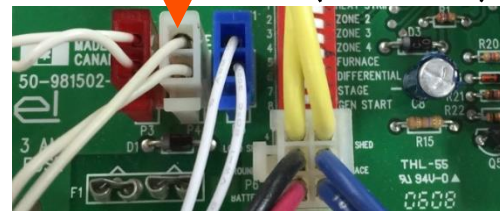
- Senses temperature from a remote location
- Can be used in up to 4 Zones



CCC 2 (10 Button)



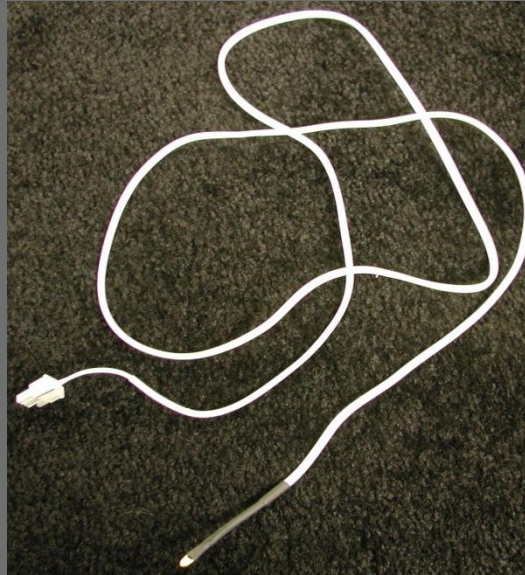
CCC (5 Button)



To test the Remote Sensor

- Used with multi-zone systems (CCC & CCC2) -

1. Disconnect 115 VAC.
2. Remove the **White** 2-pin connector from the control board.
3. Set your meter to OHMs.
4. Probe across both wires to get an OHMs value.
5. Once you have the value, compare the reading to the chart.
6. Check each wire to Chassis ground. Note: You will still get a resistance reading if one wire has gone to ground.



Temp	Ohms
25° F	27271
30° F	23528
35° F	20348
40° F	17642
45° F	15334
50° F	13360
55° F	11667
60° F	10212
65° F	8959
70° F	7876
75° F	6939
80° F	6126
85° F	5418
90° F	4802
95° F	4264
100° F	3793

DC Voltage Requirements

All wall t-stat systems require a good 12 VDC supply
(Exception = Bi-Metal System)



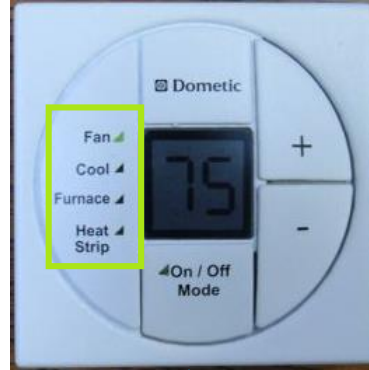
Control voltage requires MINIMUM of 10.5 VDC at main control board for controls to operate properly. Route a dedicated 12 VDC supply line (18-22 AWG) from the RV's converter (filtered side) or battery to the roof opening.

Single Zone

- SZLCD

- CT

Single Zone LCD (SZLCD)

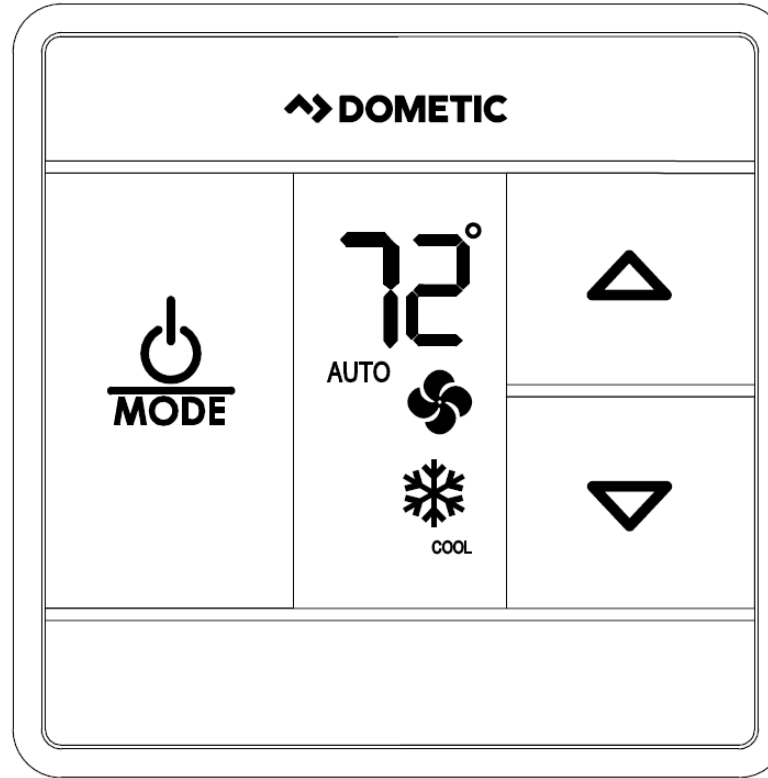


Capacitive
Touch
(CT)

All SZLCD T-Stats are
replaceable by the CT
wall T-Stat using the
same control board.



Capacitive Touch Thermostat (CT)



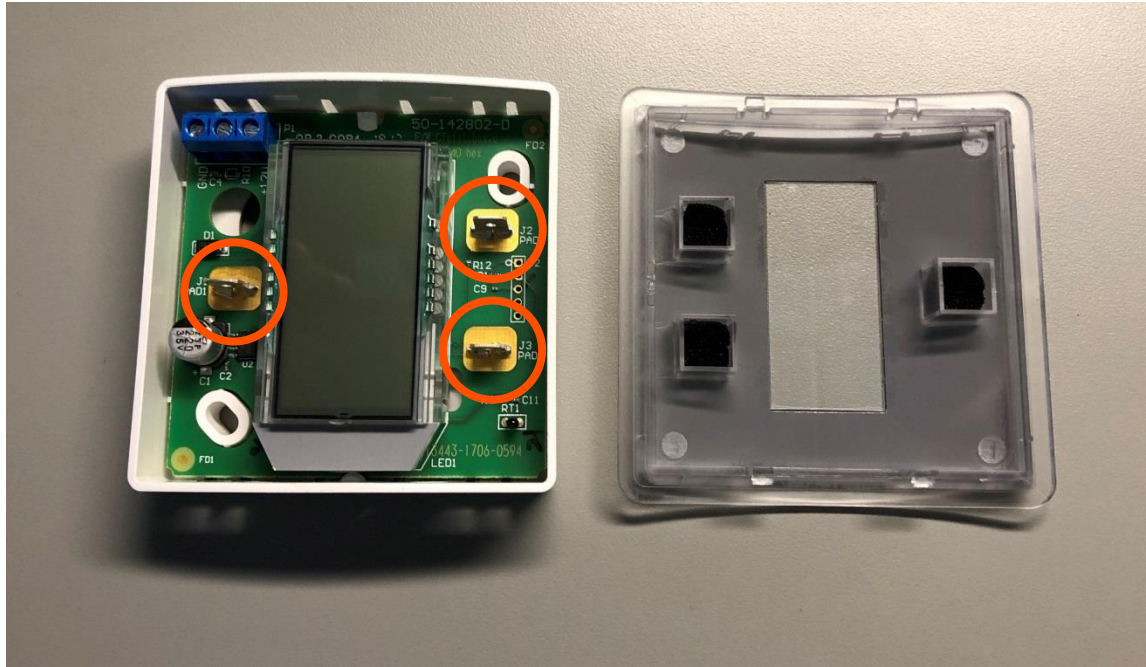
NOTE:

All CT features, modes, reset procedures, and diagnostic functions operate the same as the SZLCD thermostat.



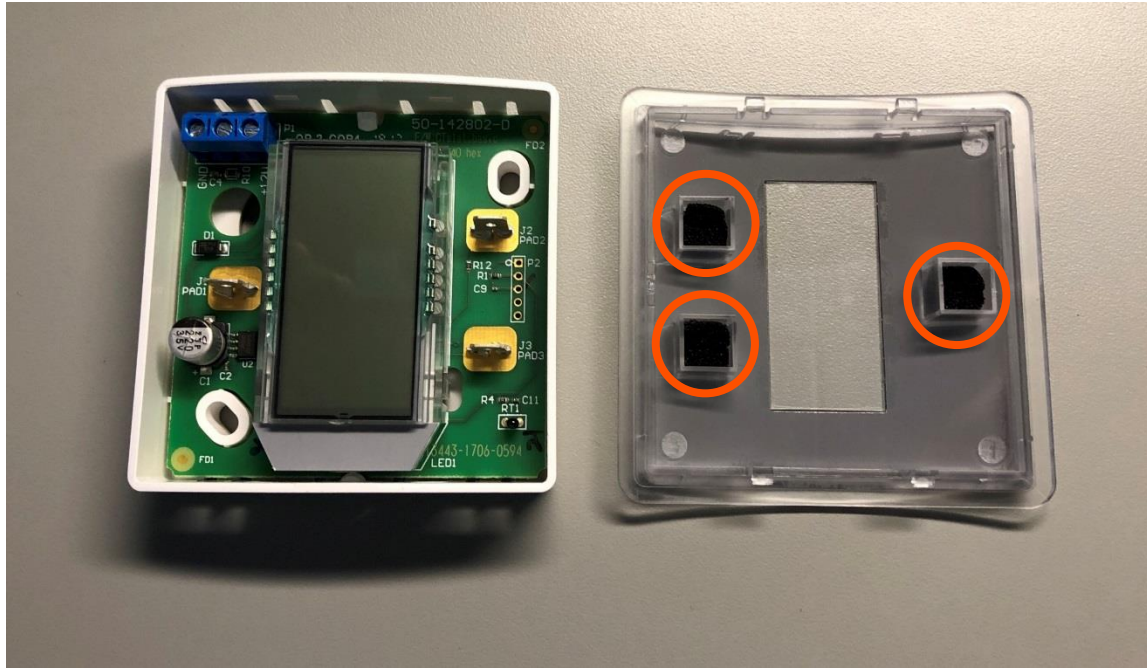
Back lit LED screen makes it easy to read in dark conditions.

Capacitive Touch Thermostat



Upon complaints of the thermostat not responding properly, having to press several times to get an action to take, or the thermostat having a mind of its own, remove the faceplate and test function by pressing the spades that represent the buttons direct. If the thermostat begins to function correctly, you will need to replace the faceplate.

Capacitive Touch Thermostat



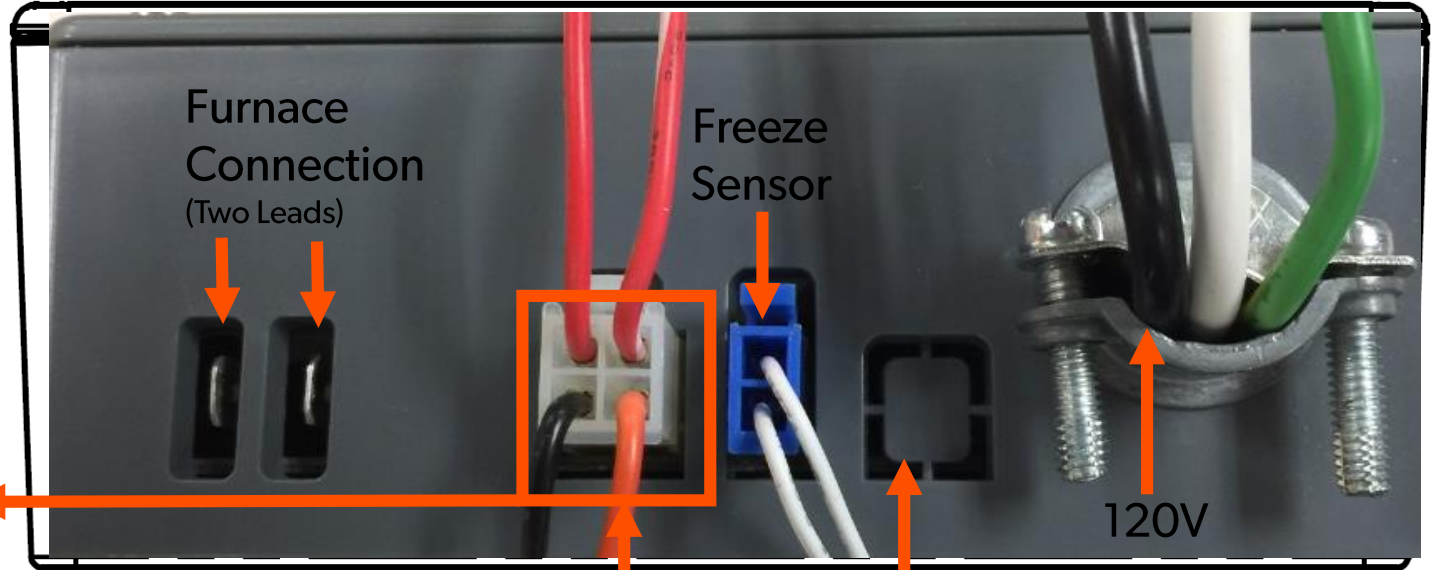
The root cause of the erratic operation of a CT thermostat is normally due to how it is being used. Education here is very important. Instruct the retail customer of the CT thermostat that this is a TOUCH thermostat. There is NOT a physical button, it works much like a smart phone screen and only requires a light tap to operate. Pressing too hard on the faceplate will ruin it and deform the foam, not allowing consistent operation.

CT & SZLCD Control Box

12VDC +/- Input
& Out to T-Stat
(Solid RED, RED w/ WHITE
stripe, BLACK)



Communication
(Orange Wire)

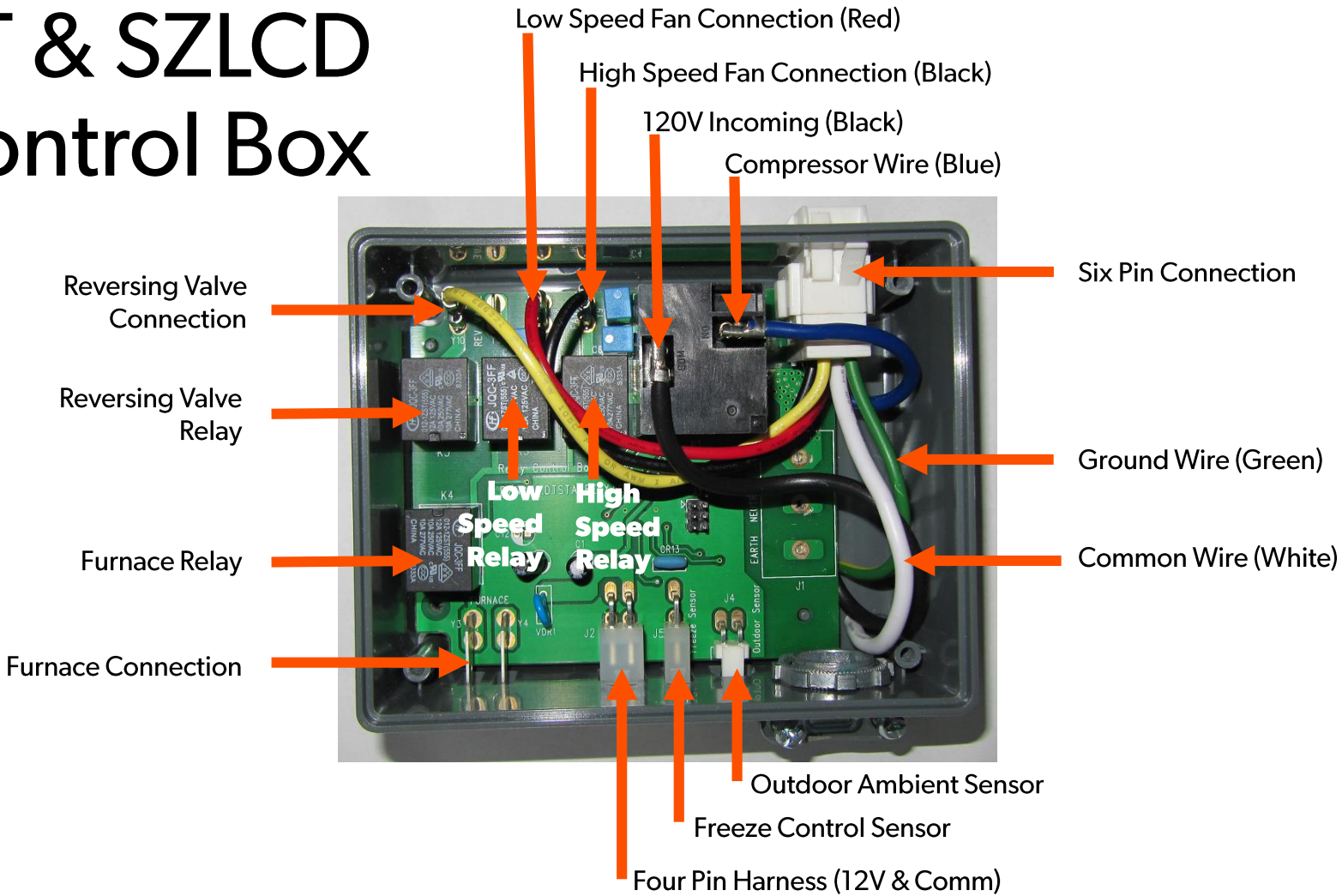


Four Pin
Plug

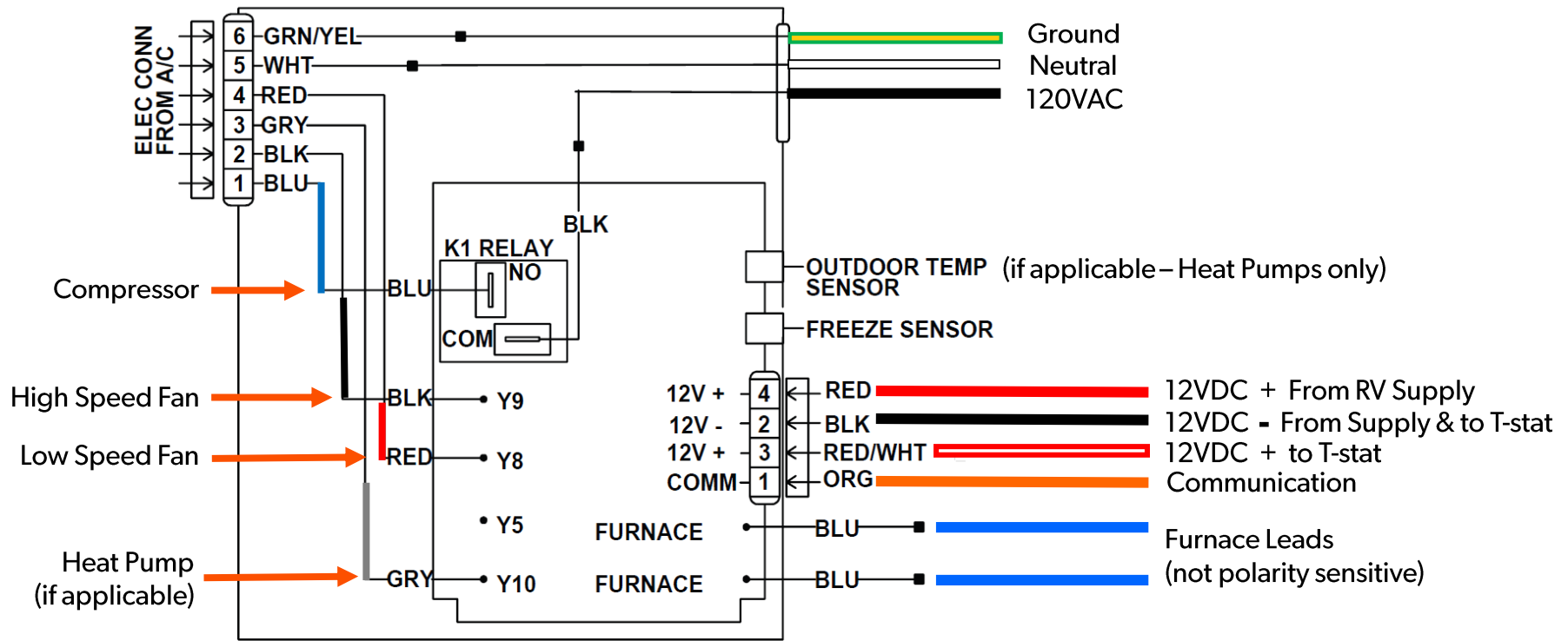
Ambient
Sensor
(Heat Pump)

Right Angle PCB Connectors Automatic Resettable DC Fuse (1.5A 12VDC)

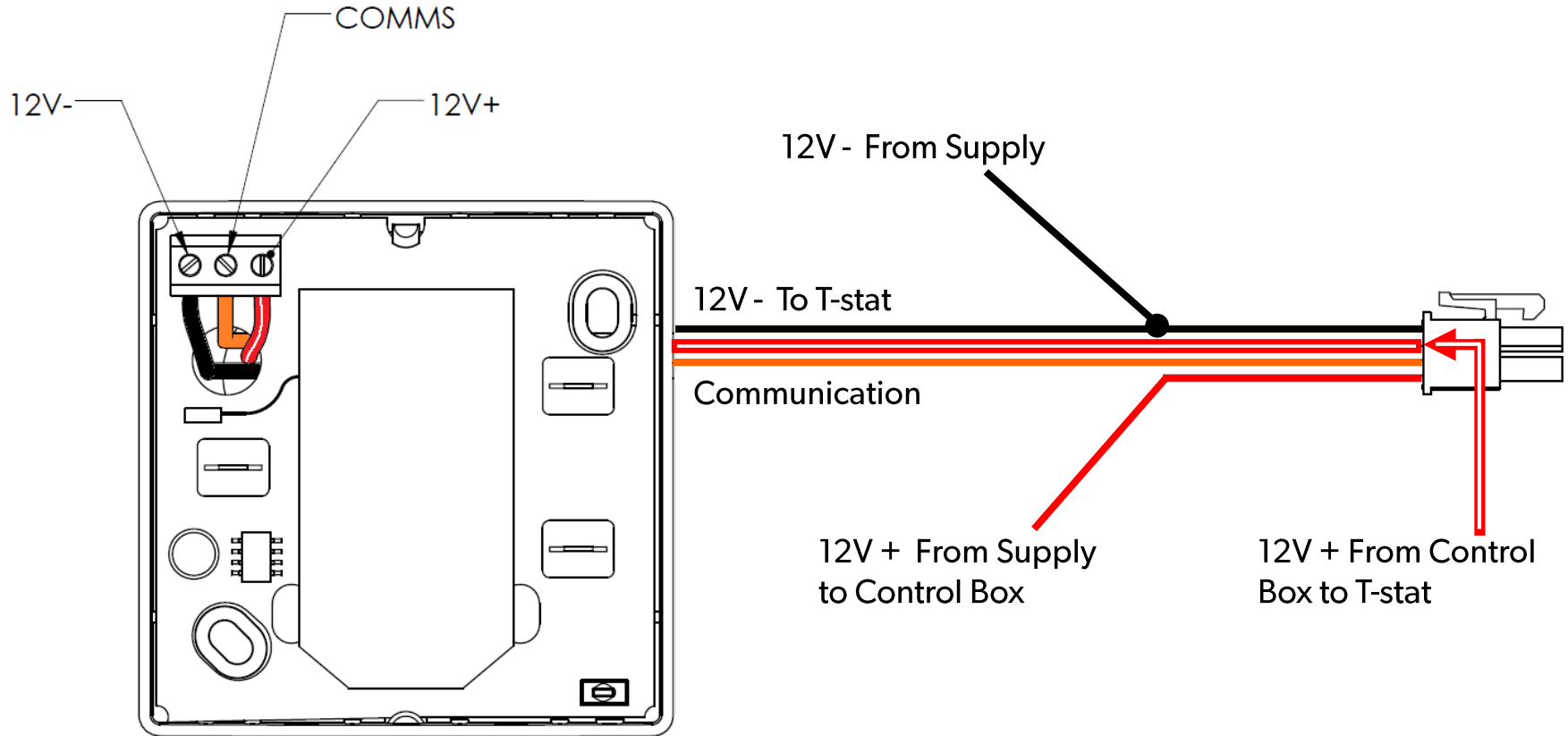
CT & SZLCD Control Box



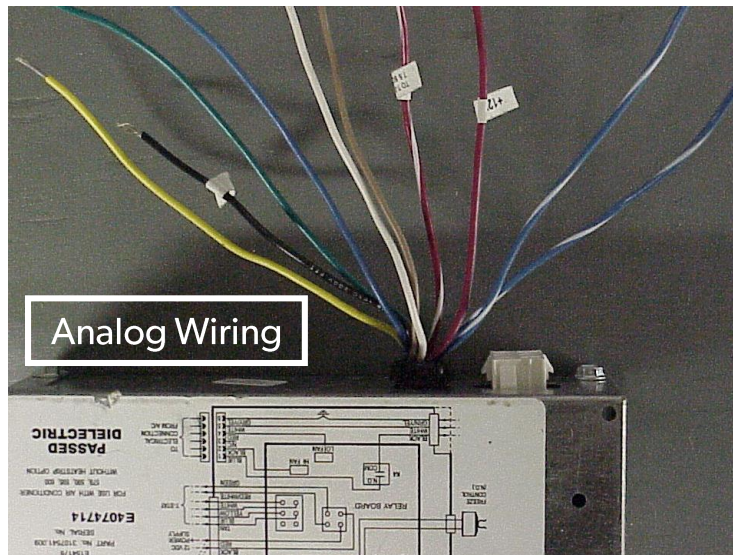
CT/SZLCD Control Box Wiring



CT/SZLCD Thermostat Wiring



Converting from Analog to CT/SZLCD

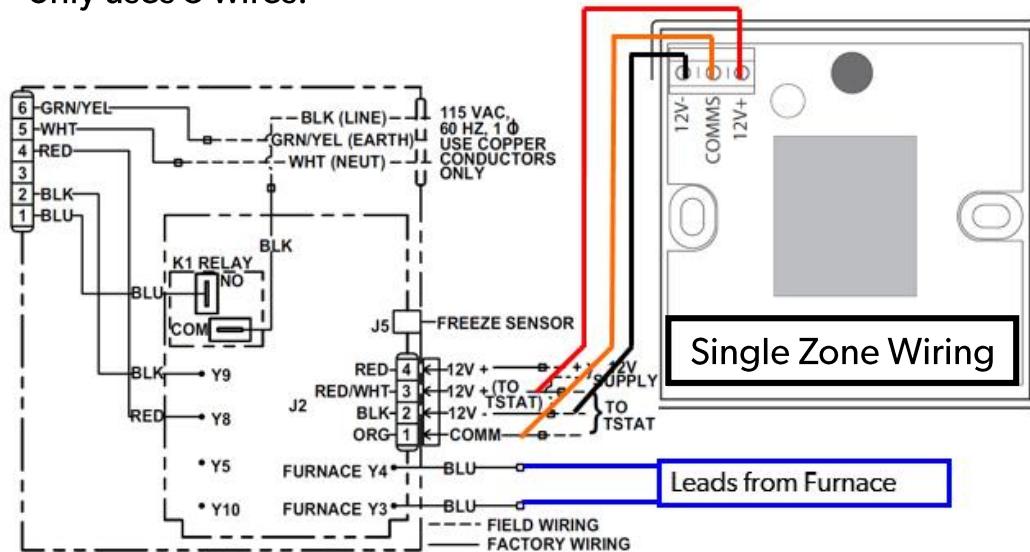


Of the existing Analog wiring, it does not matter which wires are used for the new SZLCD wiring. Just be sure to match the wires used from the control board to the wall thermostat.

Tape the extra wires up and tuck them away as spares.

The direct replacement of the Analog System is the SZLCD digital three button system. The conversion process is quite simple.

The older Analog system used 6-7 wires depending on the optional heat strip or heat pump. The new Single Zone system only uses 3 wires.

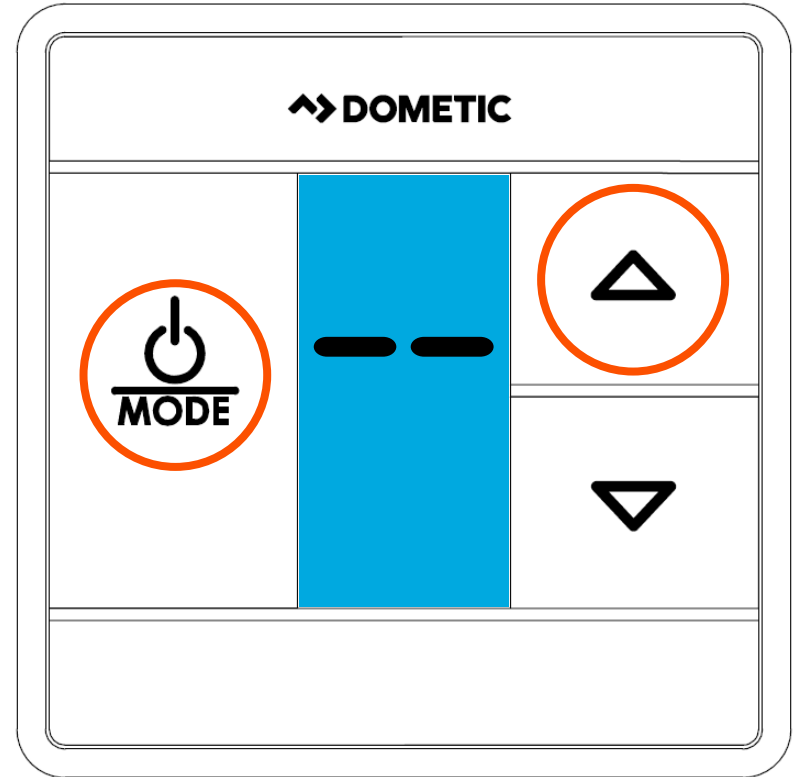


CT & SZLCD System Initialization

A system initialization will need to be performed by the installer after a new installation or any components are replaced.

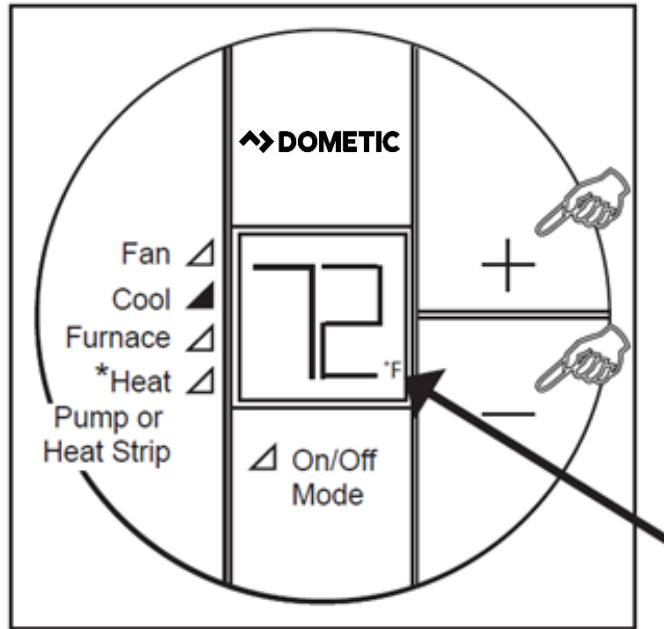
- Make sure the thermostat is turned OFF.
- Tap and hold **"UP"** and **"MODE"** for three seconds. Display will show **" - - "**
- Press the **"MODE"** button again to turn system off. This completes the initialization.

(**NOTE: SZLCD** reset procedure is the same. Instead of **"UP"**, it is the **"+"** button.)



Temperature Format °F / °C

Simultaneously press the “+” and “-” buttons to toggle between Fahrenheit and Centigrade format. °F indicates Fahrenheit and °C indicates Centigrade.



Inside Temperature

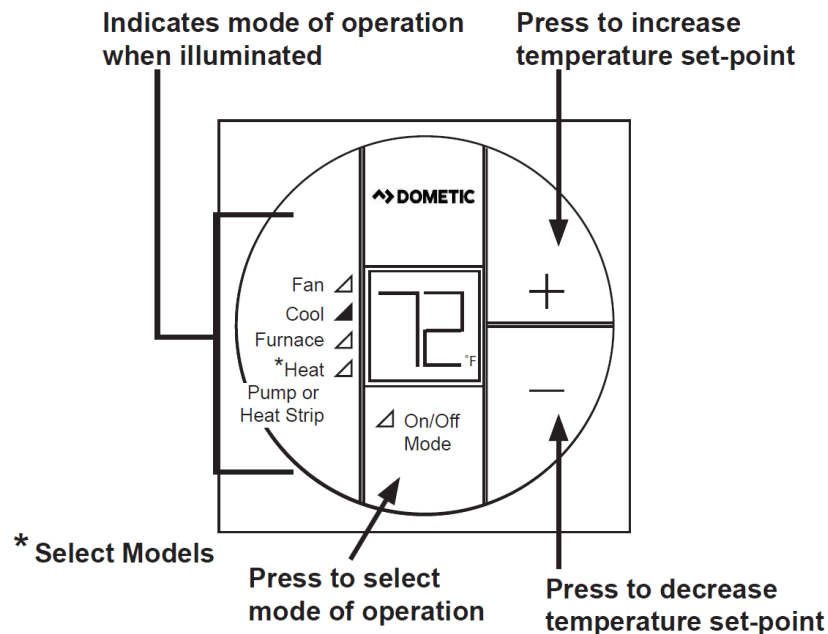
To display the Inside Temperature, the Single Zone LCD thermostat must be turned “Off”. Press either the “+” or “-” button to display the Inside Temperature.

NOTE: CT Thermostats do NOT display the “F” or “C”, just temp.

CT/SZLCD System Operation Modes

- **FAN**
- **COOL**
- **FURNACE**
- **HEAT PUMP** (Option)
- **HEAT STRIP** (Option)

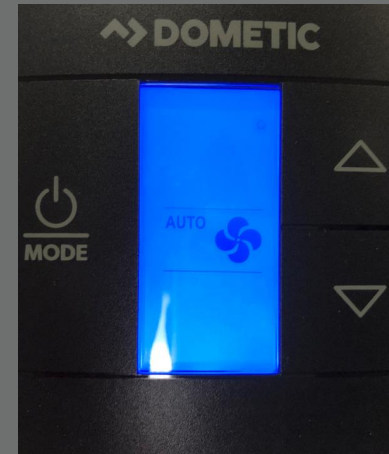
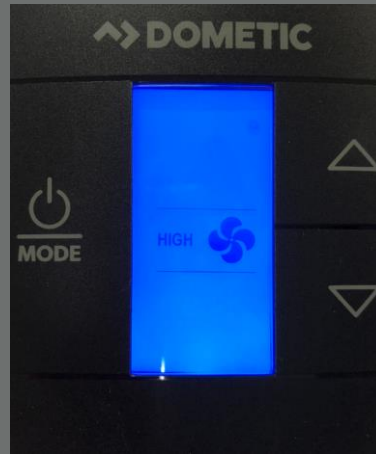
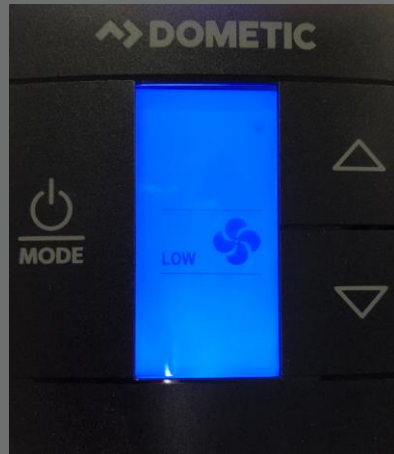
Quick Reference To Control Buttons



Press the On/Off Mode button to cycle through the available modes until the Green LED mode indicator light is next to the desired mode. You can then cycle through the options within that mode using the + & - buttons.

Fan Mode

- Press the **"MODE"** button until the display simply shows the fan icon and says the speed you are currently set to. The LED will show LOW, HIGH, or AUTO. Press the **"UP"** or **"DOWN"** arrows to select the desired fan speed.

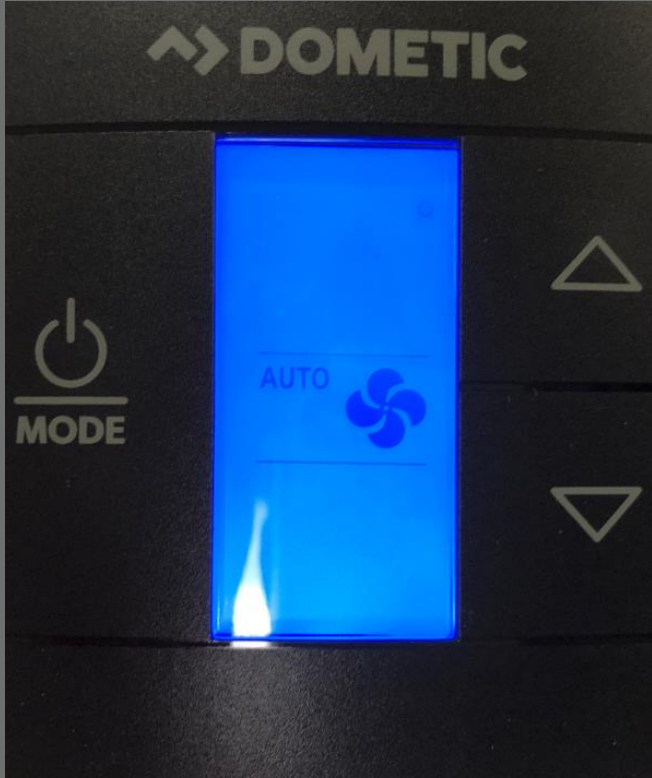


Low: The fan operates continuously at the selected speed.

High: The fan operates continuously at the selected speed.

Auto: No operation of either speed.

Auto Fan Mode



A common misconception regarding the Single Zone / CT thermostat operation is related to the AUTO fan speed feature.

Customers will complain, or think, the AC is short cycling. They will hear the AC shut off for 5-10 seconds, then come back on. In reality, this is just the fan changing speeds between high to low (or vice versa). There is a very noticeable pause as the fan is changing speeds, the compressor continues to run the whole time.

The system will NOT allow the compressor to short cycle in such a short time frame. There is a intentional delay built in to the system, if the compressor shuts off, the control board will not allow the compressor to come back on for roughly 120 seconds.

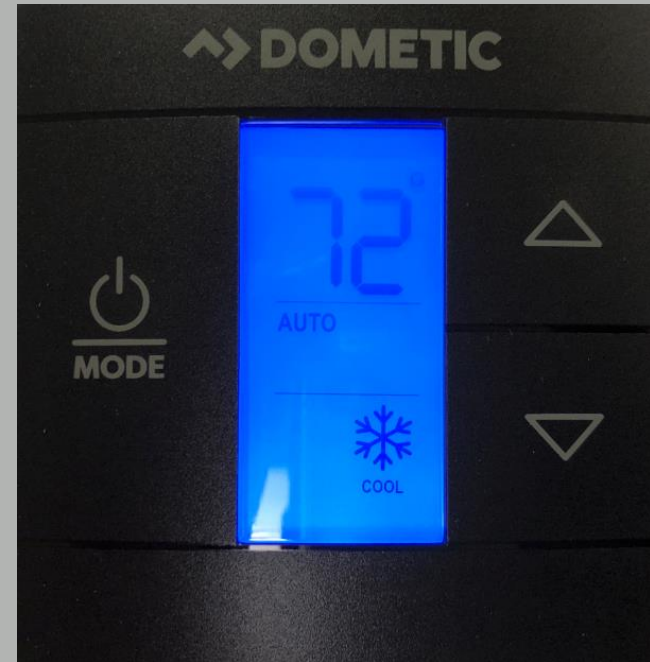
Cool Mode

- In the cool mode the system will cycle the compressor on and off based on the room air temperature and the temperature set-point on the thermostat (max 90° min 55°). The fan will turn on first followed by a delay of approximately 2 minutes before engaging the compressor.
- **LOW / HIGH:** The fan operates continuously at speed. The compressor cycles on and off.
- **AUTO:** When auto fan is selected the fan speed will vary speed depending on the difference between the temperature set-point and the room air temperature. In auto fan the compressor and the fan will cycle on and off with the thermostat.

Cool Mode Continued

- When the difference is: Greater than 5°, The fan operates on **HIGH**.
- When the difference is: Less than 5°, The fan operates on **LOW**.

Ex: If the actual room temp is 80 degrees and the thermostat is set to COOL mode, AUTO fan, with a set point of 70 degrees, we have a difference of 10 degrees and the fan will automatically run on HIGH. As the temp at the sensor begins to drop and gets to around 75 degrees, the fan will automatically switch to LOW and continue to run at that speed until the unit is satisfied or the sensor temp begins to rise. In that case the fan would switch back to HIGH.

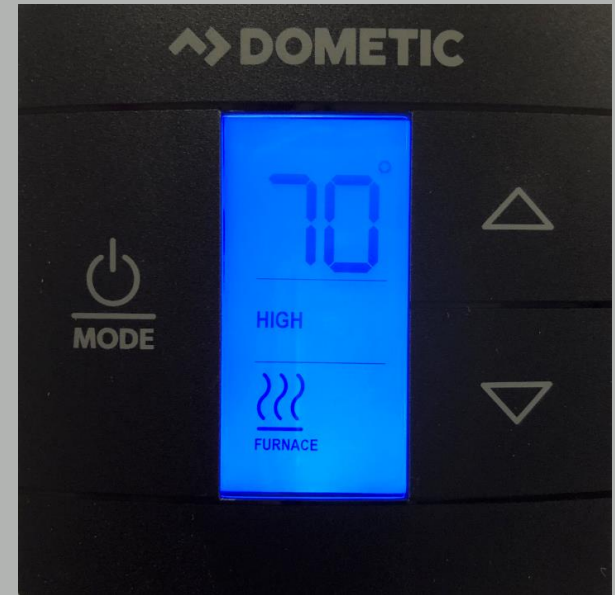
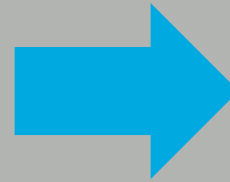


Furnace Mode

In this mode there are 3 fan speed selections:

- **LOW:** The air conditioner fan operates continuously at low speed.
- **HIGH:** The air conditioner fan operates continuously at high speed.
- **AUTO:** The air conditioner fan will be OFF.

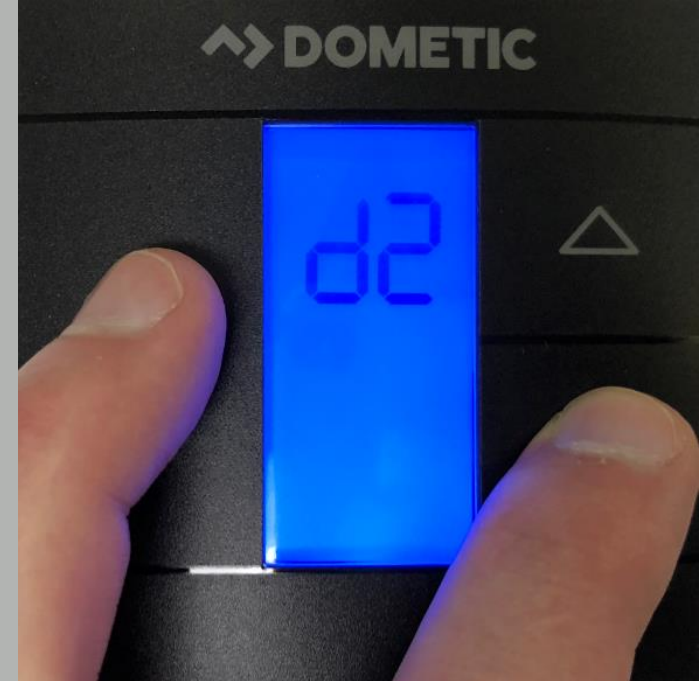
Note: If additional indoor air circulation provided by the air conditioner is not desired during Furnace Mode of operation, select **AUTO** in the Fan Mode to shut the air conditioner fan off. If **LOW** or **HIGH** is selected the air conditioner fan will continue to operate on the selected speed.



Furnace Mode Continued

In the furnace mode the system will cycle the RV's furnace on and off based on the room air temperature and the temperature set-point (max 90° - min 40°). The system can be configured to operate using an on/off differential of either 1 degree F or 2 degree F.

- With the thermostat turned off, Press and hold the **"DOWN"** and **"MODE"** button for three seconds.
- LCD will show the **"d1"** or **"d2"**
- Press the **"UP"** arrow to toggle between **"d1"** and **"d2"**
- Selection is stored in non volatile memory
- D1 = 1 Degree split / D2 = 2 Degree split
- **2F°** differential is the factory default setting



Heat Strip Mode

In the Heat Strip Mode the system will cycle the heat strip on and off based on the room air temperature and the temperature set-point. There are 3 fan speed selections available.

- **LOW / HIGH:** The fan operates continuously at speed. The heat strip cycles on and off.
- **AUTO:** The fan operates on low and will cycle on and off with the set point.

Heat Pump Mode

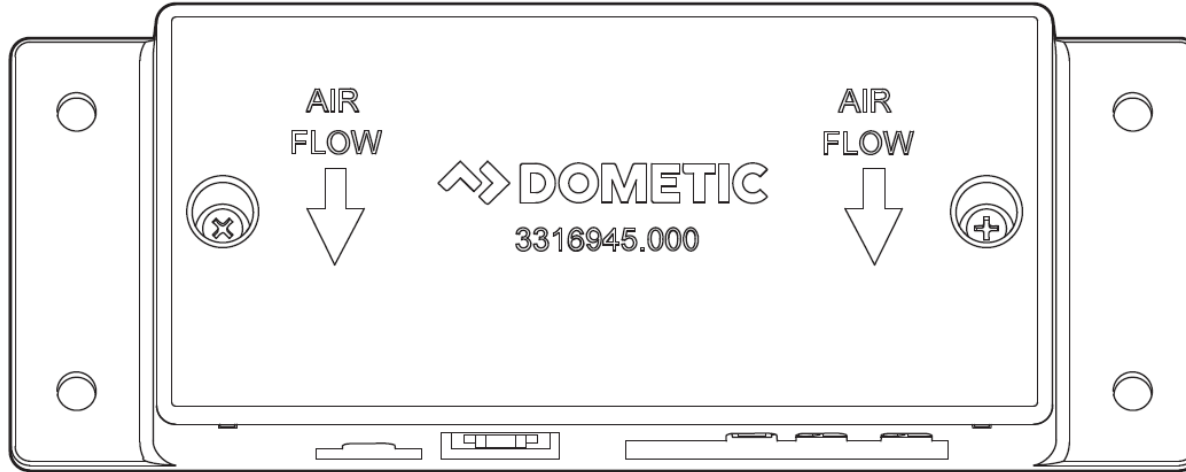
- Outdoor temperature sensor
(Required on all Heat Pump Models).
- Defrost cycle if outdoor temp is
between 30°F and 42°F
(Compressor only no fan).
- Low ambient lockout if outdoor
temp is below 30°F (Will not
automatically switch to FURN).



Troubleshooting Tips

- Double check control board and thermostat wiring.
 - Do not mistaken Orange Communication wire ("Comm") for Common.
 - Eliminate wiring through the wall by taking thermostat directly to the control box and wiring it up there.
- Use system initialization to restore factory defaults.
 - Heating 68 °F / 20 °C Cooling 72 °F / 22 °C.
- Check for error codes on the display.
 - Always attempt to clear any error codes with a system reset before proceeding any further with diagnosis.

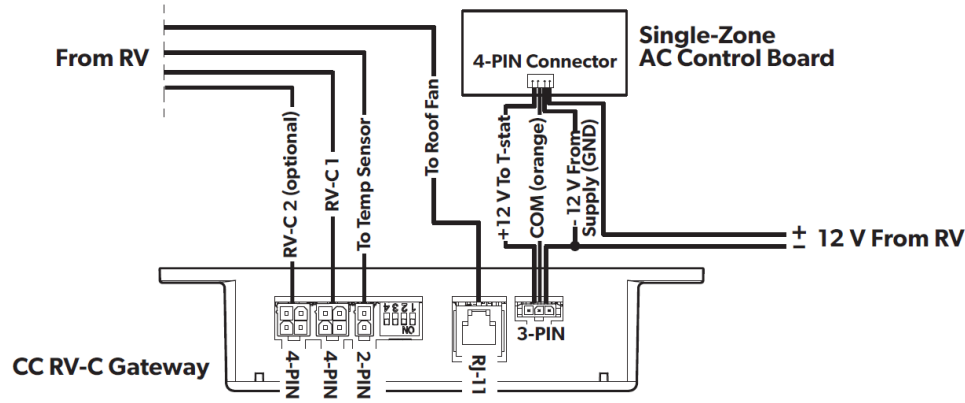
Gateway System



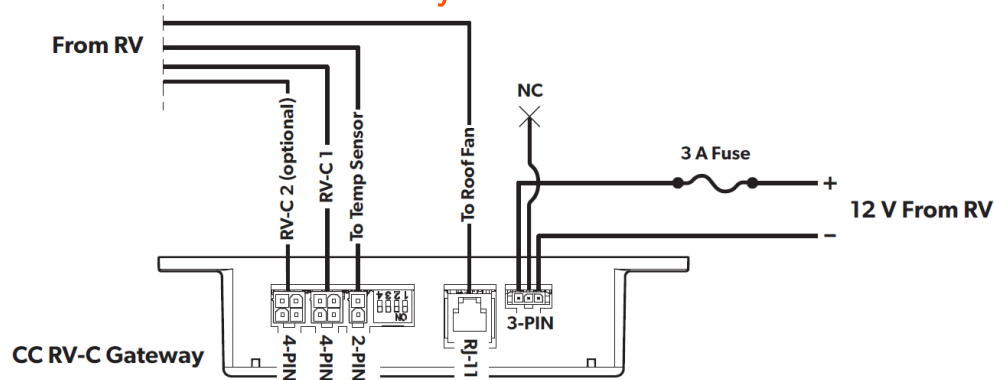
The Gateway system is designed and intended for use only in the RV as it was installed and supplied by OEM. Gateway works as a communication box between Dometic's Single Zone control board and a third party wall controller; which allows the Gateway to become a multi-functioning portal for operation of other products such as Fantastic Vent.

Gateway System Installation

Standard Installation

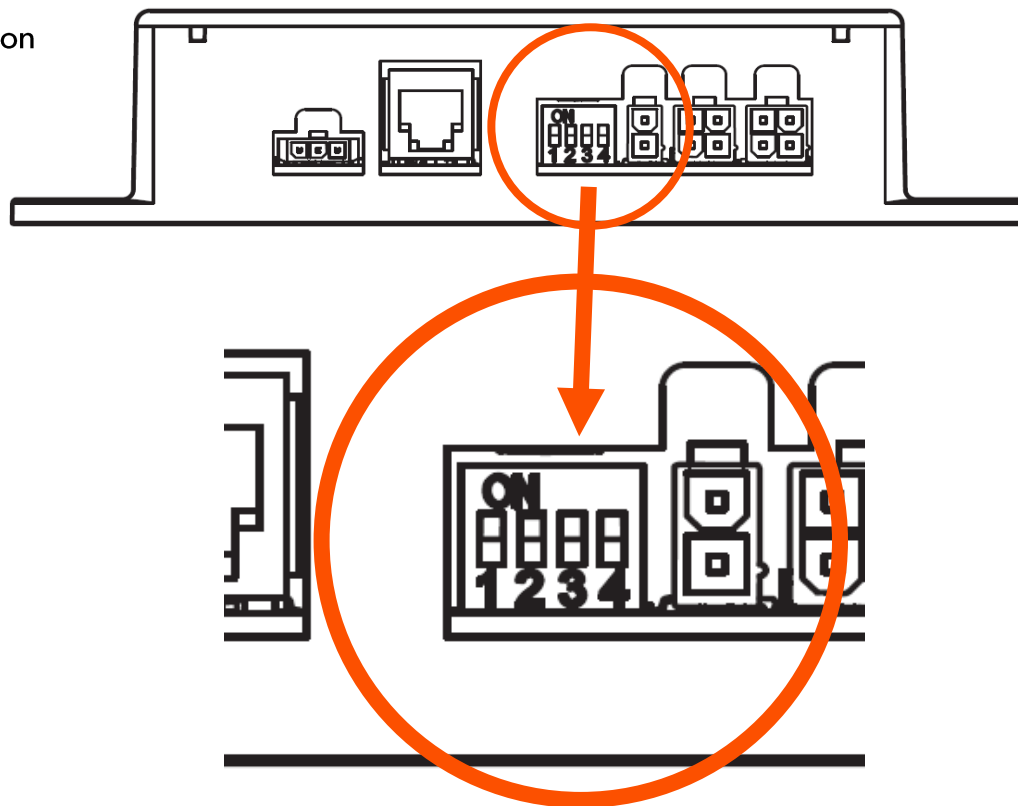


Fan Only Installation



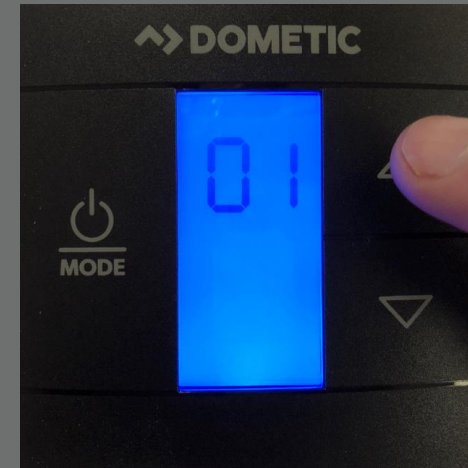
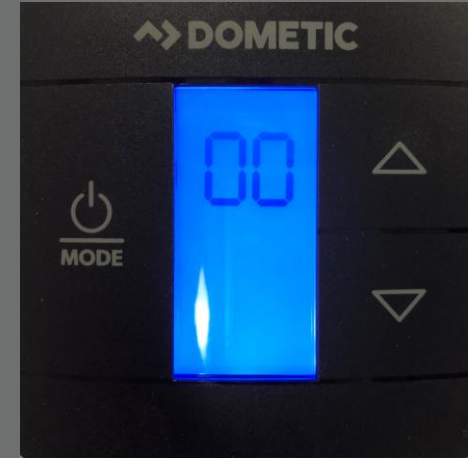
Gateway System Dip Switch Configuration

SW 1	SW 2	SW 3	SW 4	Zone Description
OFF	OFF	OFF	OFF	Error
ON	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	2
ON	ON	OFF	OFF	Error
OFF	OFF	ON	OFF	3
ON	OFF	ON	OFF	Error
OFF	ON	ON	OFF	Error
ON	ON	ON	OFF	Error
OFF	OFF	OFF	ON	4
ON	OFF	OFF	ON	Error
OFF	ON	OFF	ON	Error
ON	ON	OFF	ON	Error
OFF	OFF	ON	ON	Error
ON	OFF	ON	ON	Error
OFF	ON	ON	ON	Error
ON	ON	ON	ON	Error



CT/SZLCD Diagnostic Mode

- With thermostat turned off, simultaneously press and release the **"UP"**, **"DOWN"** and **"MODE"** buttons (Do NOT need to hold).
- Display shows the diagnostic command **"00"**. At this point you are in Diagnostic Mode.
- Use **"UP"** & **"DOWN"** arrows to cycle through the commands.
- Compressor, heat strip, furnace, fan, reversing valve outputs turned ON & OFF.
 - **Caution – 120 second compressor delay is disabled.**



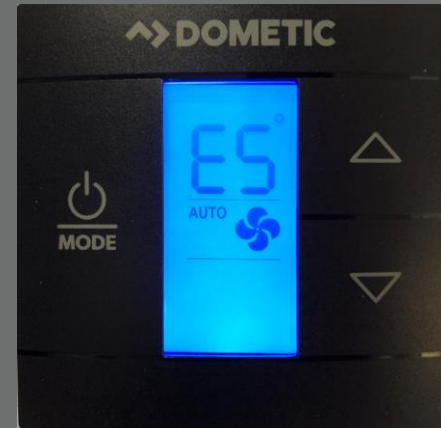
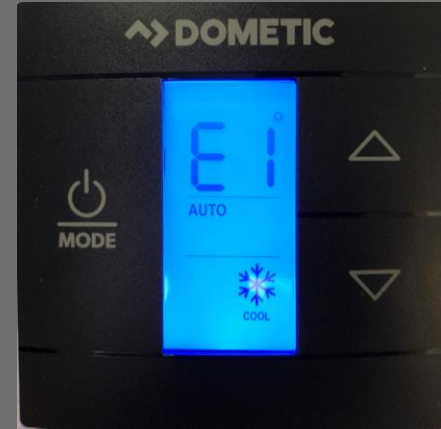
CT/SZLCD Diagnostic Mode

Command	Description	Comment
00	All outputs OFF	
01	Low Speed Fan ON	
02	High Speed Fan ON	
03	Compressor ON	
04	Furnace Output ON	
05	Reversing Valve ON	Heat Pump unit Only
06	Heat Strip ON	Heat Strip unit Only
07	LCD shows Room Temperature	Or E2 / E3
08	LCD shows Evaporator Coil Temperature	Or E5 if missing
09	LCD shows Outdoor Temperature (HP only)	Or E4 if missing

Note: Control units that are not designed for the Heat Strip or Heat Pump options will not have those specific commands available in the Diagnostic Mode with the SZLCD thermostat. Commands 5 & 9 will only show on Heat Pump models and Command 6 will only show on Heat Strip models unless you have the CT thermostat.

CT/SZLCD Error Codes

- **E1 – Loss of communication**
Causes Relay Control Module to shut down
Always try system reset to establish communication
Possible issue with Communication Wire (short, cut, removed)
Can be caused by interference (RF)
- **E2 – Room Air Sensor Open/Out of range Circuit**
No Heat or Cool operation
- **E3 – Room Air Sensor Short Circuit**
No Heat or Cool operation
- **E4 – Outdoor Ambient Sensor Out of Range**
No Heat Pump operation (specific to HP Models)
Verify Sensor is plugged in
Make sure the sensor is working by checking the Ohms
- **E5 – Freeze Sensor Out of Range/Sensor Open**
Air Conditioner operation inhibited
Make sure Freeze Control is plugged in
Verify the sensor is working by checking the Ohms



Troubleshooting Tips

- Check sensor temperatures measured by the CT/SZLCD.
 - Sensor temperatures are displayed in diagnostics.
 - Operations may be inhibited by sensor temperatures.
 - Check the Ohms value of outside ambient sensor for Heat Pump models
- Use diagnostics mode to test compressor, heat pump, heat strip, furnace, & fan outputs.
 - There is no 120 sec. delay in the diagnostics mode.



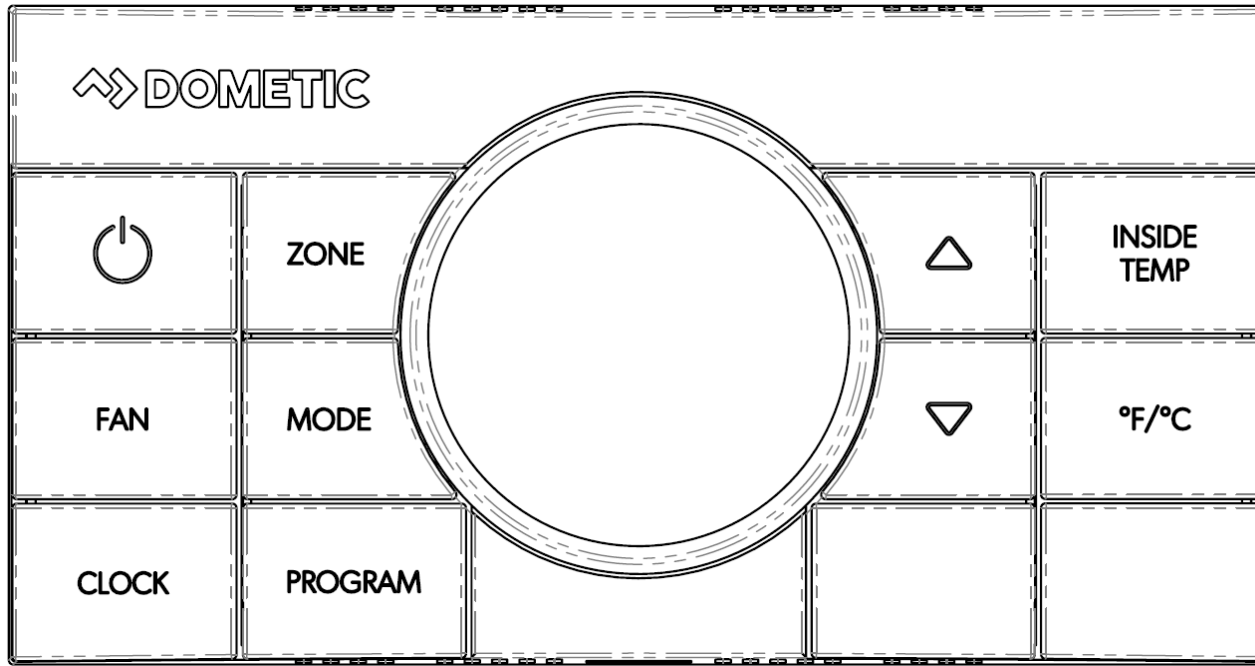
Comfort Control Center II

Mobile living made easy.

 **DOMETIC**

CCC II

(10 Button)



System Overview & Operation Modes

- Multi-Zone temperature control, from 40 to 90 °F
- Independent control of 1 to 4 Zones
- 1 to 4 Zone/Stage configurations
- Selectable 1-2 °F swing for furnace
- System configuration stored in memory
- Thermistor sensing for temperature control
- Indoor temperature push button
- Degrees F or C push button
- Auto changeover mode
- Program mode
- 120 VAC detect
- Time of day clock
- Error codes
- Diagnostic mode

Current Mode of Operation is displayed on the top of the LED

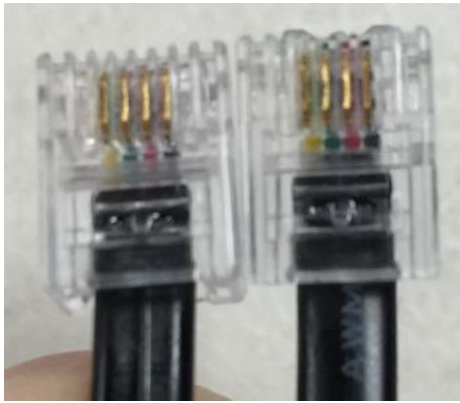


Cycle through the available Modes with the MODE button

Modes of Operation

- COOL
- AUTO
- HEATPUMP
- HEATSTRIP
- FURNACE/AQUA
- FAN
- AGS
- EXT STAGE
- PROGRAM

Communication Cable

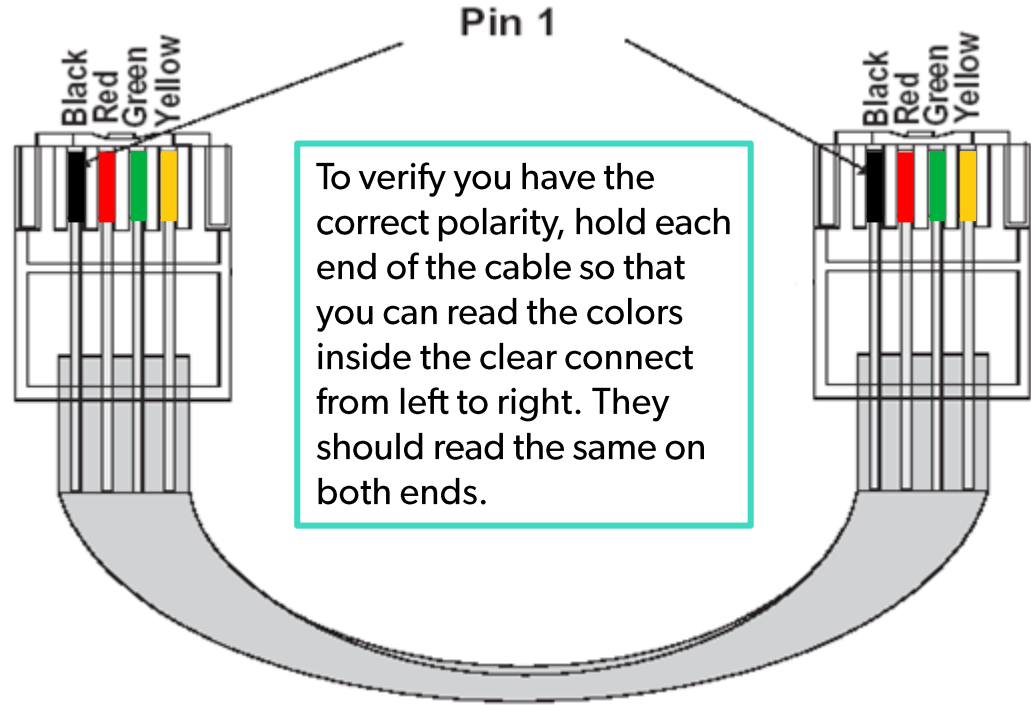


The communication cable supplies the thermostat with 12 VDC and will also supply 12 VDC to all other zones.

Note: CCC 2 (10 button) systems will need a dedicated 12V supply to every odd number AC control board or every other zone.

40' PN = **3106614.013**

18' PN = **3308013.022**

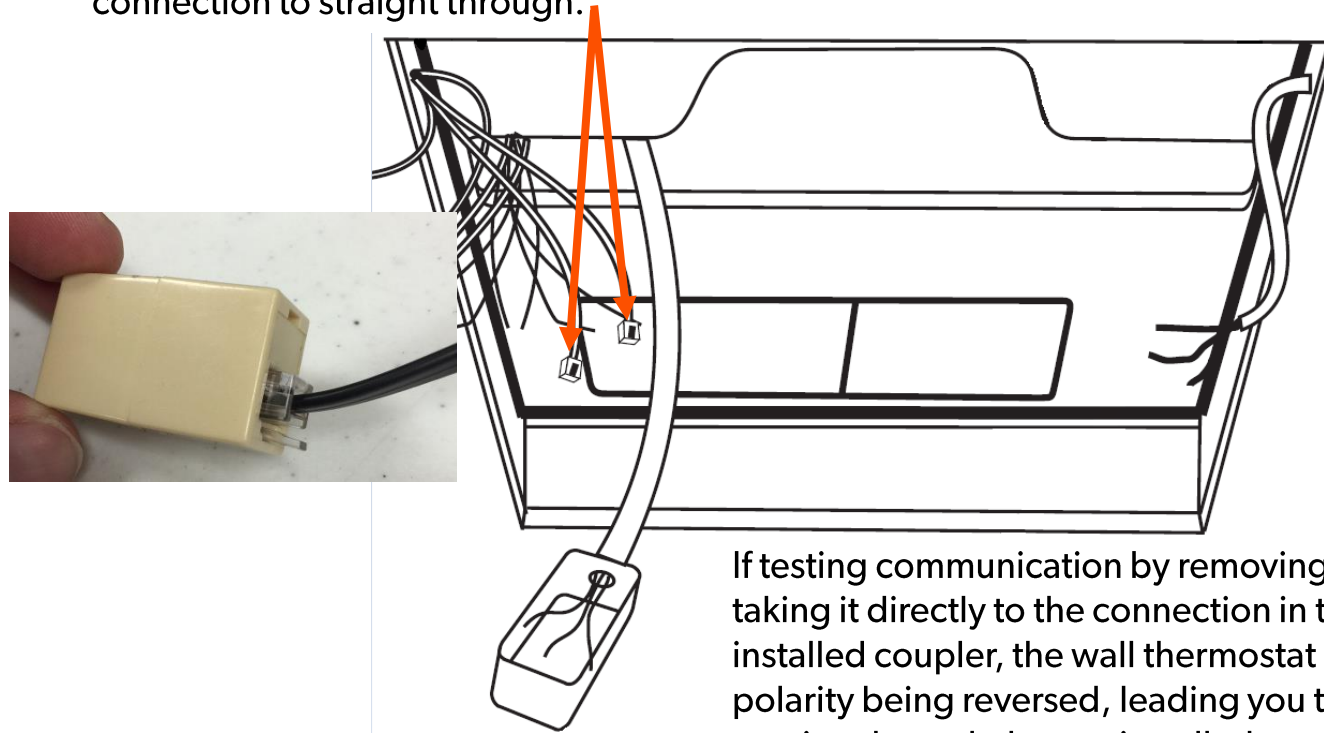


A standard telephone cable will **NOT** work

You must have straight through polarity

Communication Cable

Units with pre-installed multi-zone control boards (CCC & CCC2) have two data cables installed directly from the control boards communication ports. These wires are reversed polarity. The coupler installed at the end of the cable **MUST** be used in this situation as the coupler switches the polarity of the connection to straight through.

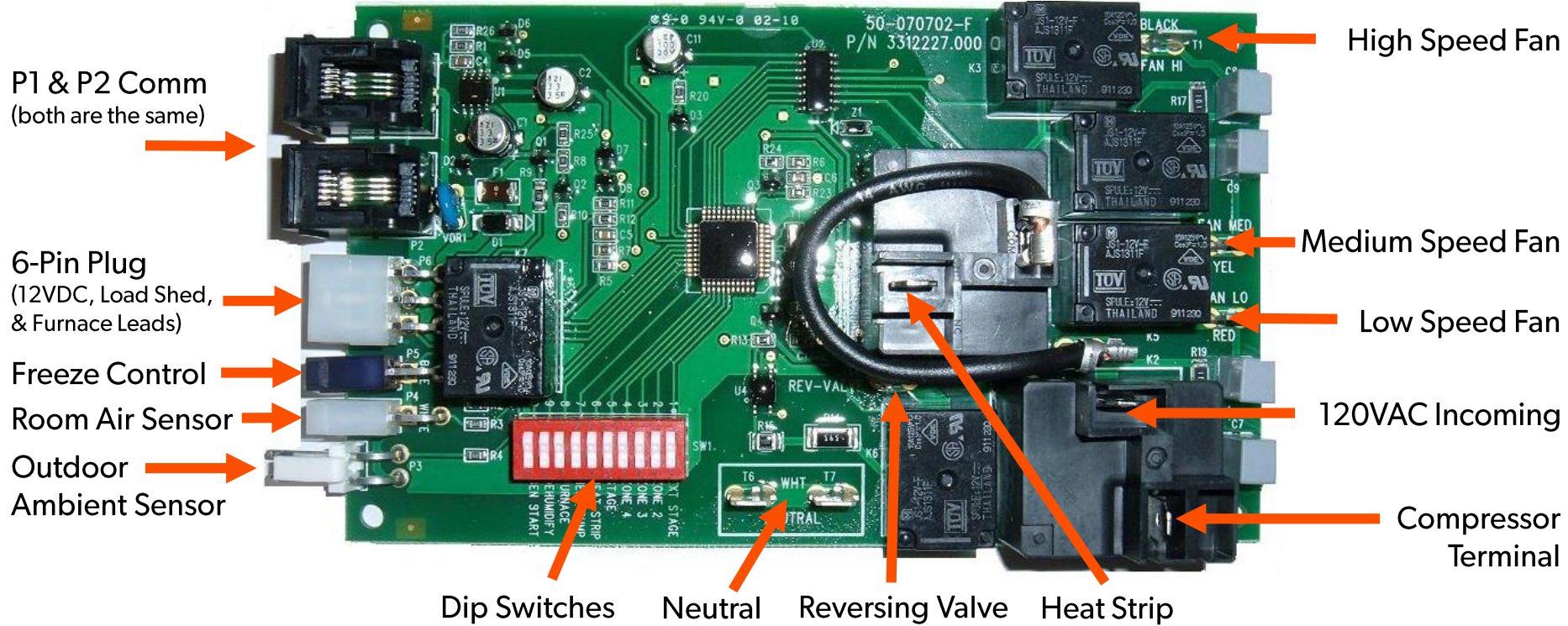


NOTE: The purpose of these is for ease of installation on pre-installed boards. They are not technically needed and can be taken out of the equation all together along with pre-installed "phone cable" if needed.

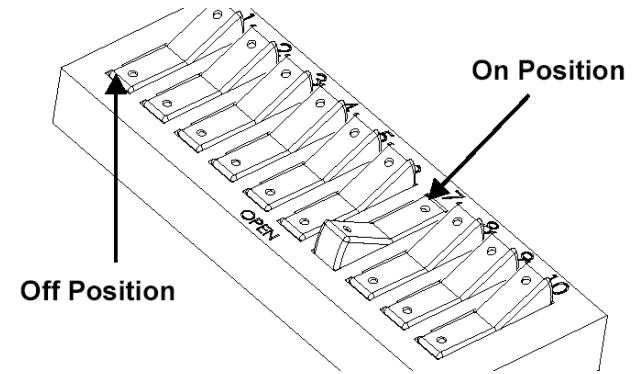
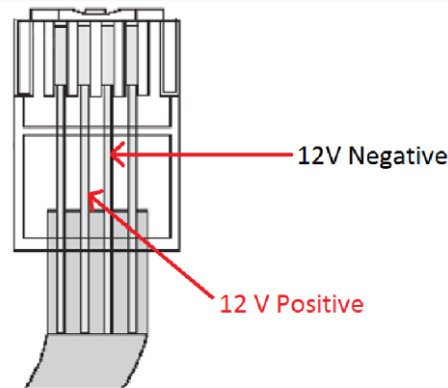
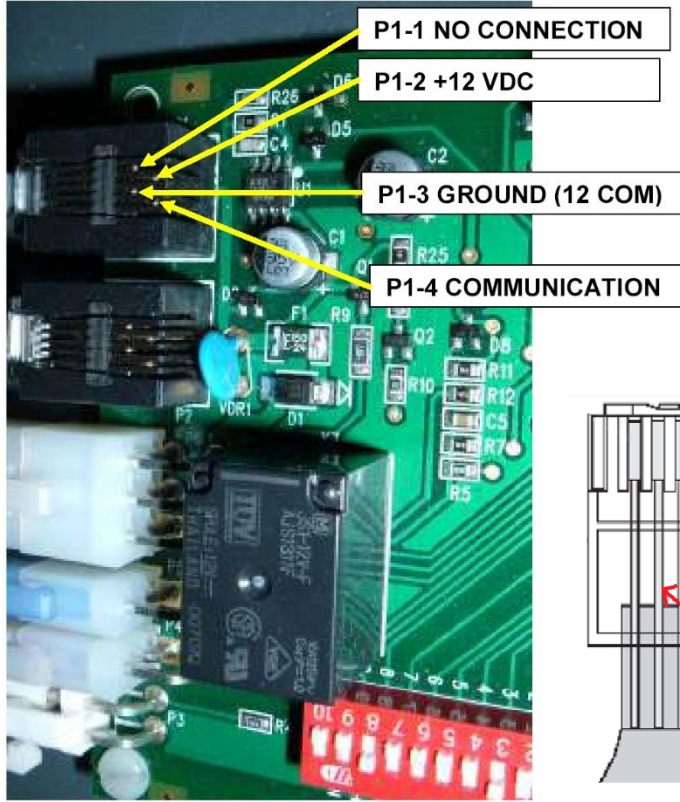
If testing communication by removing a thermostat off of the wall and taking it directly to the connection in the ceiling, without using the installed coupler, the wall thermostat will **NOT** power up due to the polarity being reversed, leading you to think that there is no power coming through the pre-installed control board.

CCC II Control Board

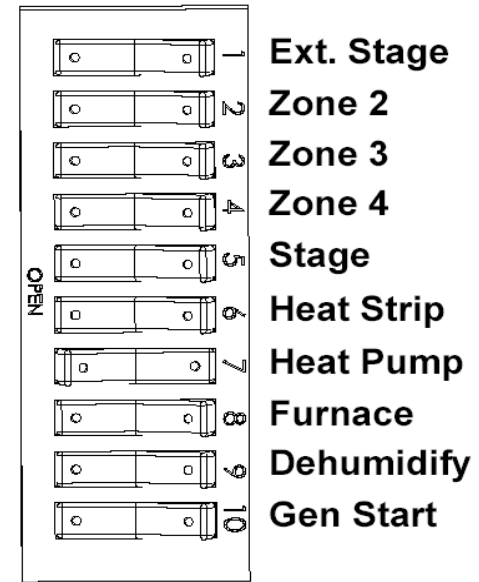
Automatic Resettable DC Fuse (1.5A 12V) Must disconnect the DC to reset.
10 Position "Rocker-style" DIP Switch.



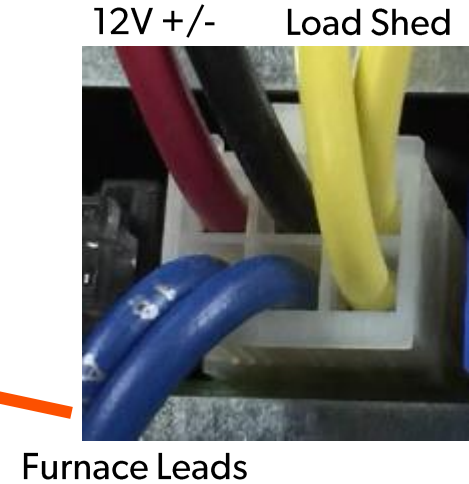
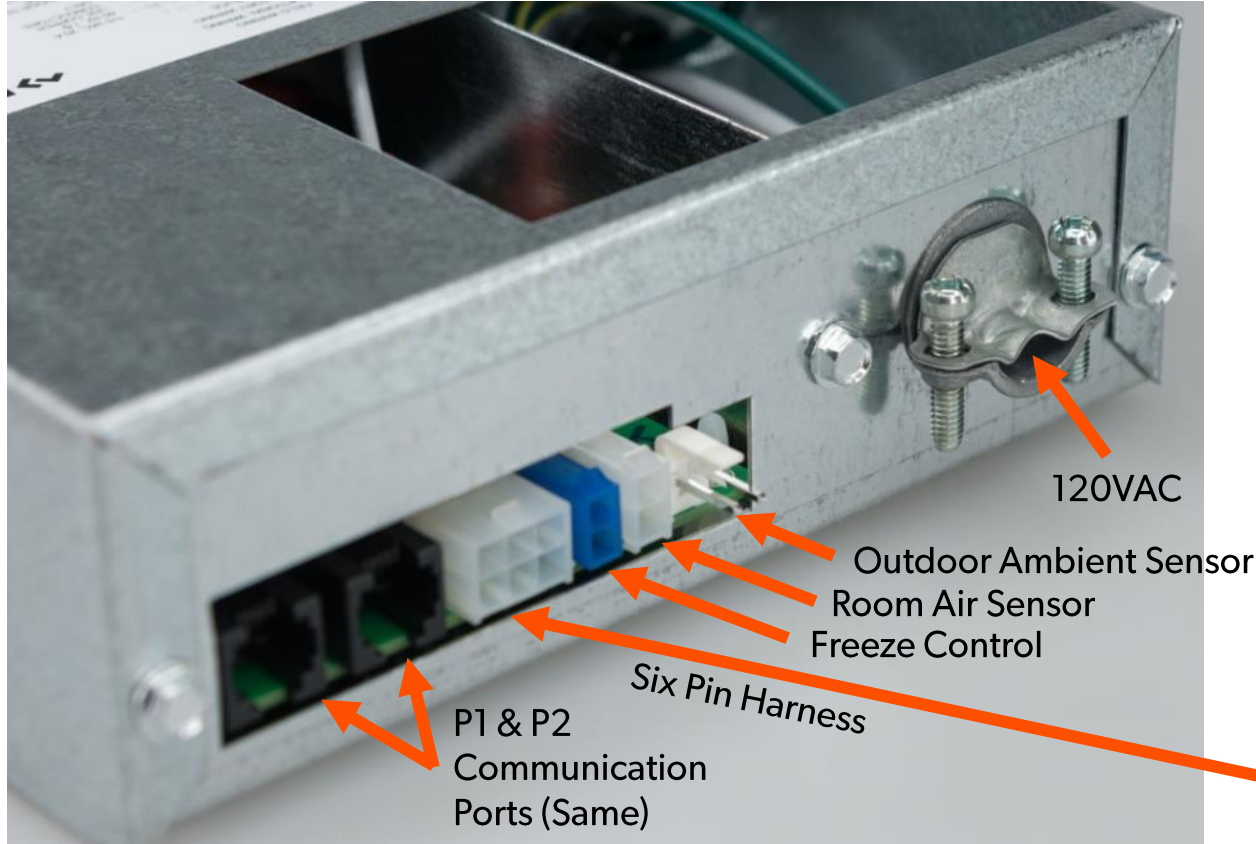
Control Board DIP Switches & Comm Pin Connections



Dip Switches



CCC II Control Box



CCC 2 (10 button) System Initialization

(RESET PROCEDURE)

- The installer of the system will set the required system DIP switches to the ON position.
- The reset procedure establishes communication between the wall T-stat and control boards. **A reset should always be attempted if an error code appears to try and clear the code before any further diagnosis is done.**
- In order for the CCC 2 thermostat to recognize the system zones, type of units installed, and their options, a system reset must be completed.
- Make sure the CCC 2 thermostat is turned off but screen backlit.
- Simultaneously press and release the **MODE** and **ZONE** buttons.
- The LCD will display **"IniT"** and all available zones.
- Press the ON/OFF button to exit system set up.

CCC 2 (10 button) System Initialization

(RESET PROCEDURE)

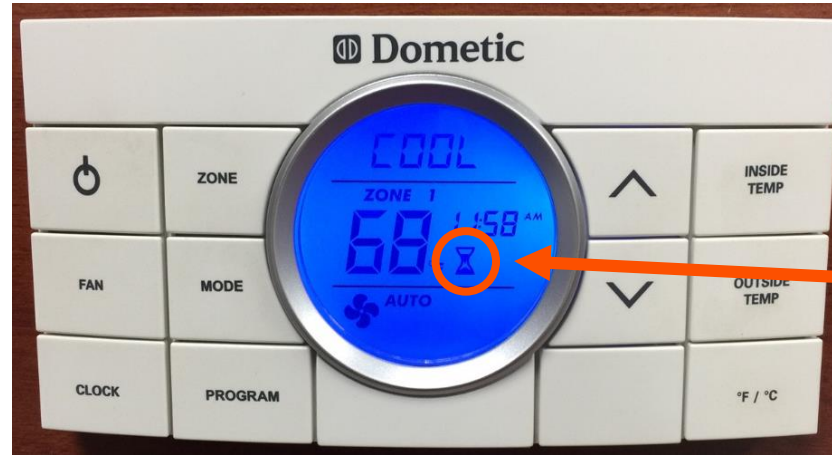
With the system completely off (nothing on the display except for the clock) press MODE & ZONE at the same time (you do not need to hold them down).



Once "IniT" appears on the display you have now entered the reset procedure. Wait a few more seconds for "ZONE" (1-4) to appear before hitting the power button to exit.



Cool Mode



NOTE: The hour glass shown in this picture indicates the system is calling for cooling but the compressor is currently in delay. This delay can be upwards of two minutes.

- Select **COOL** with the **MODE** button.
- Select the temperature set point (Min 55 – Max 90).
- In the **COOL** mode, you have four fan speed options.
 - Low, Medium, High, & Auto

Fan Operation

Select Low, Medium, High, or Auto

- Use Auto Fan Speed for no fan operation in **FURN** Mode

Auto mode per set point

- 8 degrees or more - fan will operate on **HIGH**
- 4 to 8 degrees - fan will operate on **MED**
- 4 degrees or below - fan will operate on **LOW**



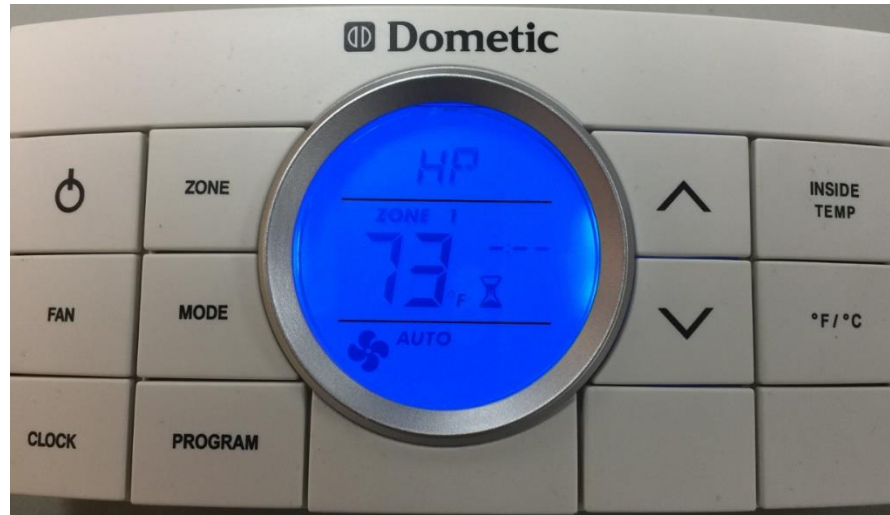
NOTE: Unlike the Single Zone / CT Control Systems, the AUTO fan feature here will not have the noticeable pause when automatically changing speeds. This system seamlessly changes between HIGH, MED, & LOW

Furnace Operation



- Select FURN or AQUA with the mode button.
- Select the temperature set point (Min 40 – Max 90).
- Programmable ON/OFF differential of either 1F° or 2F°.
 - Press Program and Up buttons for "dIF1".
 - Press Program and Down buttons for "dIF2".
 - 2F° differential is the factory default setting.
- Programmable to show "AQUA" for Aqua-Hot heating systems.
- To change the setting from "**FURN**" to "**AQUA**" or vice versa, simultaneously press the up and down buttons. The LED will display the selected option.

Heat Pump



- Defrost cycle if outdoor temp is between 30°F and 42°F.
- Auxiliary heat if outdoor temp is below 30°F (if Furnace/AQUA available).
- In Auto fan, the compressor will come on first (to build pressure & heat) followed by the fan in approximately 15 seconds.
 - In defrost, LCD shows 'HP/DEFR'.
 - In auxiliary heat, LCD shows 'HP/FURN -or- AQUA'.

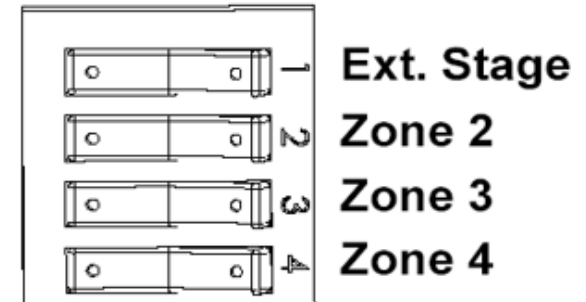
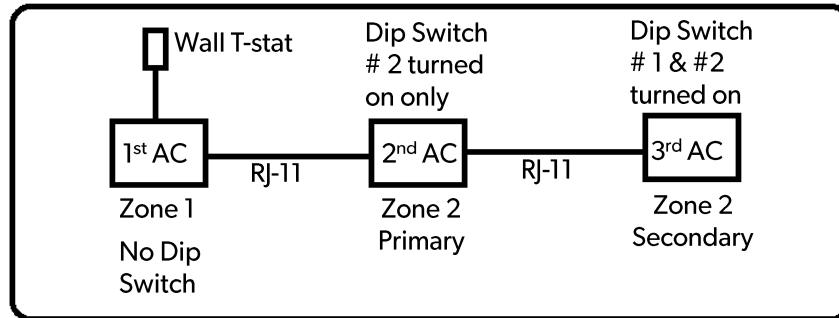
Auto Mode



- Also known as “Auto Change Over Mode”. Only available if the selected zone has a heat option.
- Automatically heats or cools the selected zone.
- In the AUTO mode the system will automatically change the mode of operation from cool to heat or from heat to cool.
- In order for this mode to operate, the zone being programmed must contain either a heat pump, heat strip, or furnace heating source.
- Cooling occurs if temperature is above the set-point by 2°F.
- Heating occurs if temperature is 2°F below the set-point.
- If more than one heat source is available on this zone, the priority for selecting the heat source will be heat pump (first), furnace (second) and heat strip (third).

EXT Stage Operation

- Configuration allows two A/C units on the same zone.
- Same zone DIP switch setting on the power modules.
- One of the power board modules will have the EXT STAGE DIP switch selected.
- Two A/C or heat pump units use the same set-point temperature for controlling the comfort level in the same zone (no temperature offset as in stage operation).
- Timing is controlled to ensure compressor start-ups are offset by 20 to 30 seconds.



Ex: If you have 3 AC units but want to stage two of those units to operate as one zone, lets say Zone 2.

- The first control board would act as Zone 1 and no Zone or Ext. Stage dip switch would be turned on.
- The second units control board would only be set to "Zone 2" on position. This would be Zone 2 Primary.
- The third AC units control board would have both "Ext. Stage" and "Zone 2" turned on. This would become Zone 2 Secondary.

Program Operation

- Programmable time of day events.
- Allows two ON/OFF events on each zone.
- Different mode and time settings allowed for each zone.
 - Note: Customers who complain of being locked out of their controls, not able to change the mode of operation, are most likely stuck in Program Mode. If the T-stat display shows either "**PROG 1**" or "**PROG 2**" they are in Program Mode.
 - In order to exit the Program operation, simply hold down the Program Button for 3-5 seconds until "PROG 1-2" is no longer on the display.



Troubleshooting Tips

- All DIP switch selections should be completed before system initialization. The options will only be available on the desired zone if the specific dip switches have been set for those options and a reset performed on the wall t-stat.
- Select desired zone & operating mode; check for error codes on the LCD. Always perform a system reset to try and clear any error codes before proceeding with any further diagnosis.
- Ensure 120 VAC is present – compressor will turn on only if 120 VAC is available (error E7 after 2 minutes if no 120 VAC).

Troubleshooting Tips

- With three or more zones, ensure 12VDC is supplied to every other zones control board (or – every odd number AC control board). The CCC 2 will need more 12VDC than the CCC 5 button system.
- Check sensor temperatures measured by the CCC 2 - operation can be inhibited by sensor measurements. (Use diagnostics to observe freeze sensor value). Check the Ohms resistance of the remote and ambient sensors.
- Use diagnostics mode to force specific operations on – select desired zone & test operation of outputs - compressor, heat pump, furnace, fan, etc.

Diagnostic Mode

- With the thermostat turned off (screen backlit), simultaneously press and release the "**Program**", "**Fan**" and "**F/C**" buttons.
- Display shows "**DIGN**", the zone and the diagnostic command.
- Use up & down buttons to cycle through commands.

Program



Diagnostic Mode Cont.

Diagnostic Command	Description	Comment
00	All outputs OFF	No Operation
01	Low Speed	Low Fan On
02	Medium Speed	Medium Fan On
03	High Speed	High Fan On
04	Reversing	Reversing Valve On
05	Compressor ON	Compressor Running
06	Heat Strip	Heat Strip On
07	Furnace Output On	Furnace On
08	Load Shed Output On	Compressor Off

Diagnostic Mode Cont.

Diagnostic Command	Description	Comment
09	LCD shows Indoor Temperature for the Remote Sensor	E2 if missing, E3 if shorted
10	LCD shows Outdoor Temperature	E4 if missing
11	LCD shows Evaporator Coil Temperature	E5 if missing
12	LCD shows 120 VAC status	'On' or '--'
13	LCD shows Load Shed Status	'On' or '--'
14	LCD shows Stage DIP Switch Position	'On' or '--'
15	LCD shows Heat Strip DIP Switch Position	'On' or '--'

Diagnostic Mode Cont.

Diagnostic Command	Description	Comment
16	LCD shows Heat Pump DIP Switch Position	'On' or '--'
17	LCD shows Furnace DIP Switch Position	'On' or '--'
18	LCD shows Dehumidifier DIP Switch Position	'On' or '--'
19	LCD shows Gen Start DIP Switch Position	'On' or '--'
20	LCD shows Ext Stage DIP Switch Position	'On' or '--'

Tip: You can go through these commands one of two ways. You can either go through commands 1-20 in a specific zone (Zone 1-4), or you can go into a specific command (5 – for compressor for example) and while staying in that specific command, hit the ZONE button to check the same command on the next zone and so on.

Error Codes

- **E1** – Loss of communication
 - Two power module DIP switches set as same zone.
 - Possibly a faulty communication cable.
 - 12 Volt DC not clean, try direct DC from battery.
 - Causes power module to shut down.
- **E2** – Room Air Sensor Open Circuit
 - Unlikely to occur; if no remote sensor, CCC2 wall thermostat built-in sensor is used.
 - Useful in diagnostic mode to test if remote sensor is installed on zone or open.
 - No heat or cool operation.
- **E3** – Room Air Sensor Short Circuit
 - Error shown if either remote sensor or CCC thermostat built-in sensor is shorted.
 - No heat or cool operation.
- **E4** – Outdoor Ambient Sensor Out of Range
 - No heat pump operation.



Error Codes Cont.

- **E5** – Freeze Sensor Out of Range
 - No AC operation.
- **E6** – Open Circuit Humidity Sensor
 - Dehumidify operation is inhibited (not used on current units).
- **E7** – 120 VAC not Detected
 - 120 second delay to allow for GEN START operation.
 - All 120 VAC relays switched off (furnace relay not affected).
 - Verify white neutral wire on control board has good connection to run capacitor and that capacitor is good.
- **E8** – Invalid Zone Configuration
 - Heat pump & heat strip selected on same zone. Not allowed on the CCC 2 system.
 - No heat or cool operation on zone.
- **E9** – Invalid Zone Configuration
 - Dehumidify along with Heat Pump or Heat Strip
 - No heat or cool operation on zone.



CCC2 Display Stuck at 32° F

- Verify set in Fahrenheit vs. Celsius
- Verify remote sensor plugged in (in DIGN #9 – Temp reading or E2)
- Verify wiring of remote sensor has not been cut
- Check each sensor to ground
- Verify RJ-11 coupler for shorting
- Check 12 volt grounds
- Try replacing or using test Freeze Control Sensor, Remote Room Temp Sensor, and/or Outside Ambient Sensor



Comfort Control Center (5 Button)

Mobile living made easy.

 **DOMETIC**

Comfort Control Center (CCC 5 Button)

System Overview

- Multi-Zone temp control from 40 to 90 °F
- Independent control of 1-4 Zones.
- Selectable 1-2 °F swing for furnace.
- System configuration stored in memory.
- Thermistor sensing for temperature control.

Modes of Operation

- Cool
- Fan
- Furnace
- Heat Strip
- Heat Pump
- AGS (Auto Gen. Start)



CCC 5 Button System Reset

- Turn the ON/OFF switch to the "OFF" position (Bottom of T-stat).
- Simultaneously press and hold the "MODE" & "ZONE" buttons and then turn the ON/OFF switch to the "ON" position.
- **"FF"** should appear on the display. At this point you can release "MODE" & "ZONE"
- If **"EE"** appears when the buttons are released, perform the reset again. If **"EE"** keeps displaying, there is a communication problem issue in the system.
- When a dip switch is turned on or off after initial configuration, a reset must be performed to allow the comfort control center to recognize the updated change.
- Any time a component is added or removed, it is best to perform a reset.



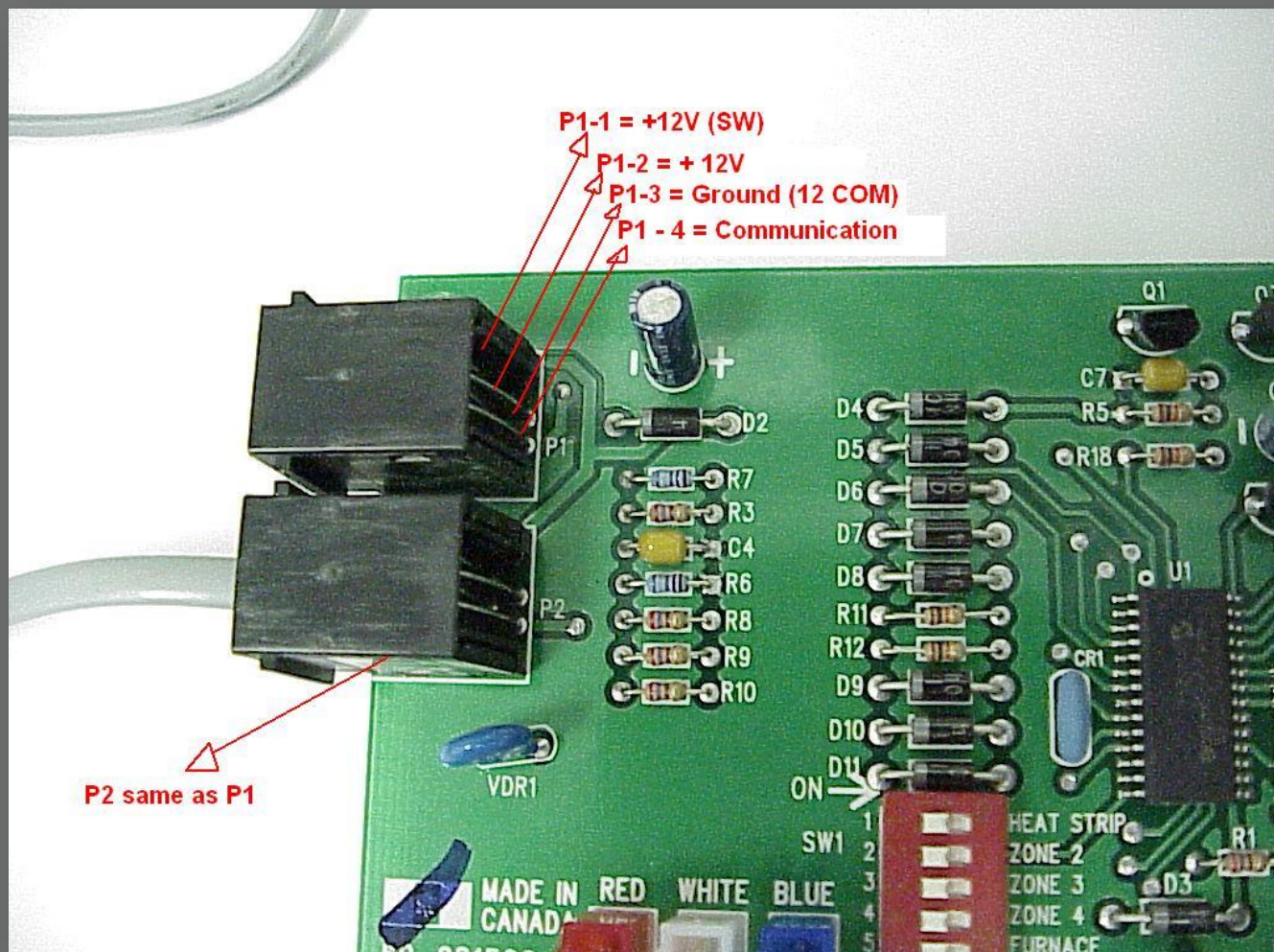
CCC 5 Button Multi-Zone Troubleshooting

When EE is displayed on the T-Stat

- Disconnect all communication cables to all units but the unit with the T-Stat (Zone 1) and do a reset.
- If that zone works, and no **EE** is present, you know the comm cable and control board for that unit is working.
- Connect the next zone and reset.
- With each zone connected do a reset.
- When a zone is connected and the **EE** is displayed that zone has a problem with the cable or control board.
- When you find out where the problems lies (specific zone) you will need to determine if the cable or the control board is the issue using a test RJ-11 Cable.
- Remove the "installed" cable from the equation and use your test cable, do a reset, if the problem is still persistent then the board is defective. If the problem goes away you know the issue lies in the "installed" cable that was removed during testing with test cable.



18' Comm. Cable
3106614.013
40' Comm. Cable
3308013.022

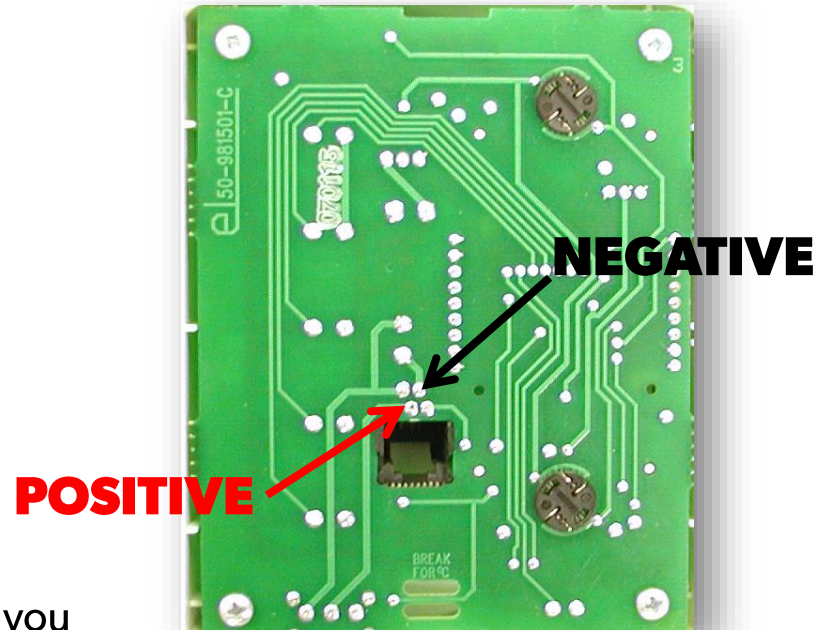


Symptom – No Display



You should see +12 VDC. If you see – 12 VDC, you have reversed polarity on communication cable.

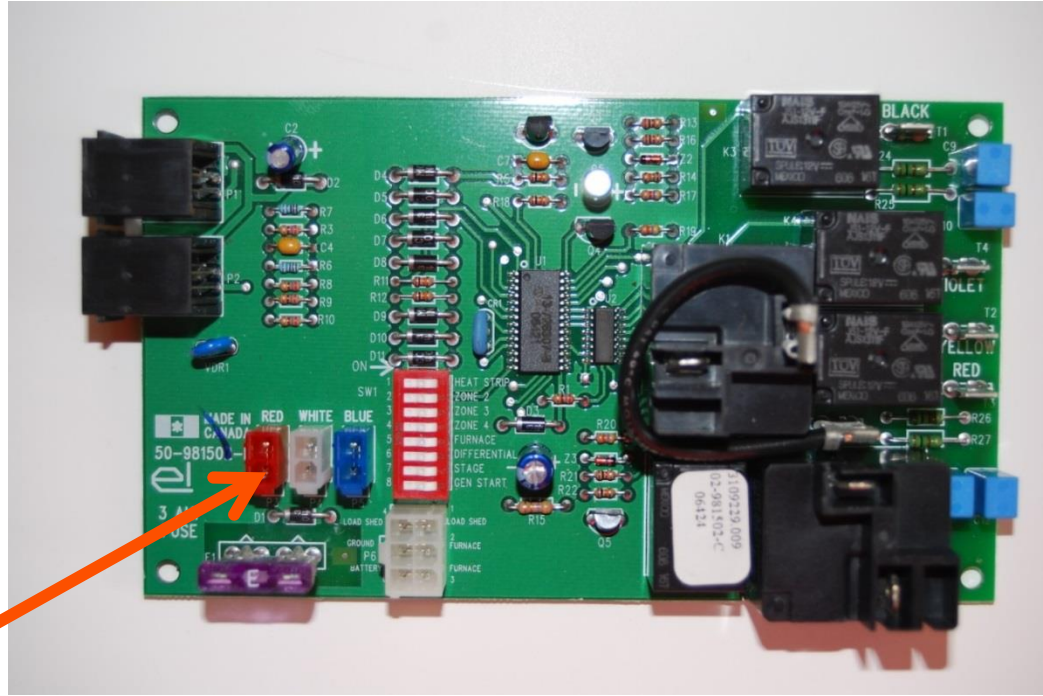
Check Solder joints above the communication cable connection on the back side of the thermostat.



DIP Switches

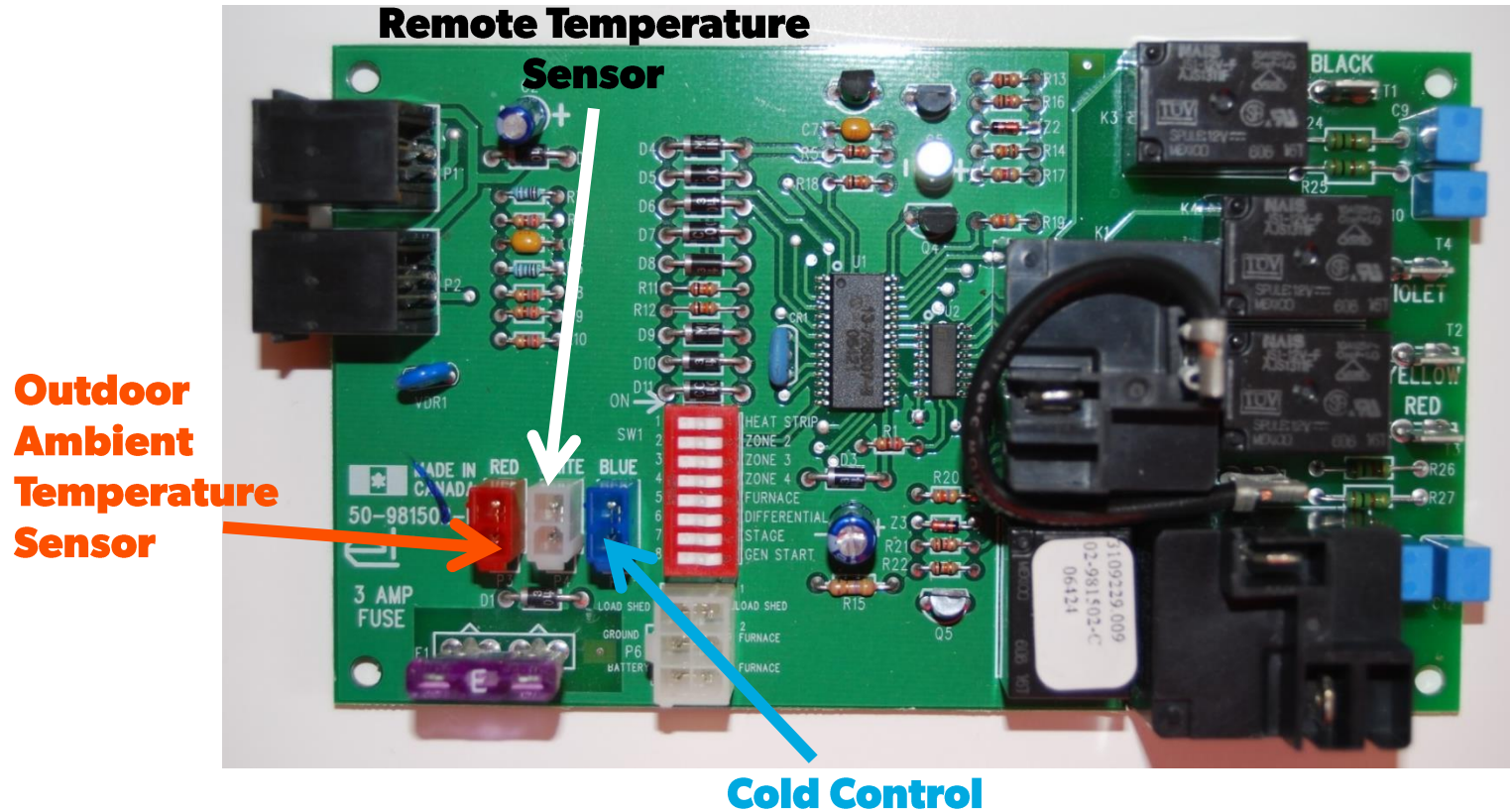
For proper operation the dip switches MUST be set:

1. Heat Strip
2. Zone 2
3. Zone 3
4. Zone 4
5. Furnace
6. Differential
7. Stage
8. Gen Start



There is no Heat Pump dip switch on the 5 button board. In order to tell this system a HP is installed, an Outdoor Ambient Sensor must be installed.

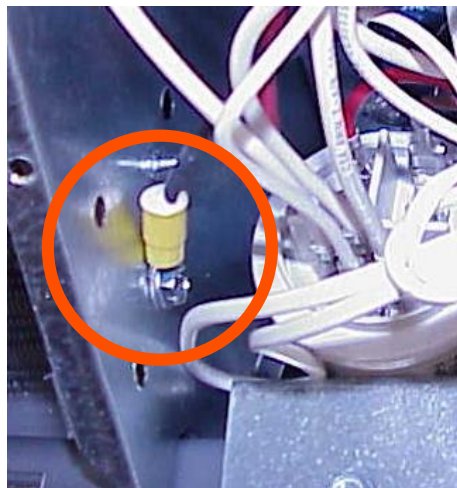
Temperature Sensors



To Test The Ambient Temp Sensor

The ambient sensor is the outside air temperature sensor and is used on CCC (5 button) Heat Pumps Only. Allows the Heat Pump to operate down to 32°F.

1. Disconnect 115 VAC.
2. Remove the **RED** 2-pin connector from the control board.
3. Set your meter to OHMs.
4. Probe across both wires to get an OHMs value.
5. Once you have the value, compare the reading to the chart.
6. Check each wire to Chassis ground. Note: You will still get a resistance reading if one wire has gone to ground.

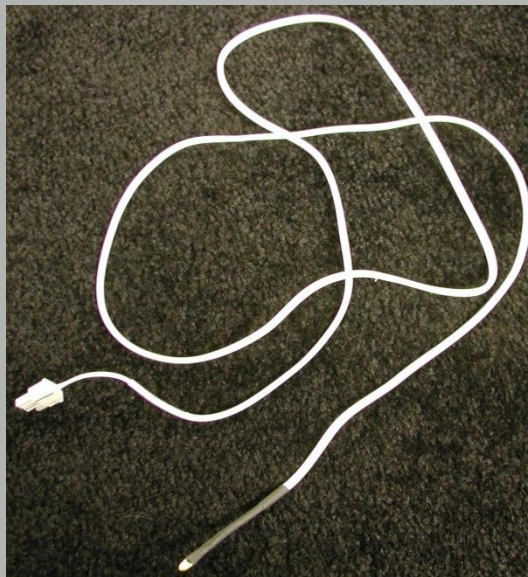


Temp	Ohms
25° F	27271
30° F	23528
35° F	20348
40° F	17642
45° F	15334
50° F	13360
55° F	11667
60° F	10212
65° F	8959
70° F	7876
75° F	6939
80° F	6126
85° F	5418
90° F	4802
95° F	4264
100° F	3793

To test the Remote Sensor

- Used with multi-zone systems
(CCC & CCC2) -

1. Disconnect 115 VAC.
2. Remove the **WHITE** 2-pin connector from the control board.
3. Set your meter to OHMs.
4. Probe across both wires to get an OHMs value.
5. Once you have the value, compare the reading to the chart.
6. Check each wire to Chassis ground. Note: You will still get a resistance reading if one wire has gone to ground.

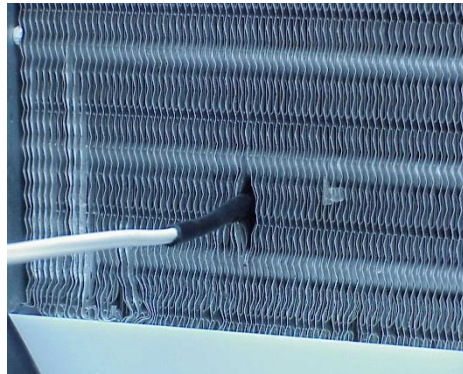


Temp	Ohms
25° F	27271
30° F	23528
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40° F	17642
45° F	15334
50° F	13360
55° F	11667
60° F	10212
65° F	8959
70° F	7876
75° F	6939
80° F	6126
85° F	5418
90° F	4802
95° F	4264
100° F	3793

To test the Cold Control

Used on both air conditioners and heat pumps. When the temperature of the coil reaches the freezing point the compressor will stop operation and the fan will automatically go to high speed and defrost the coils.

1. Disconnect 115 VAC.
2. Remove the **BLUE** 2-pin connector from the control board.
3. Set your meter to OHMs.
4. Probe across both wires to get an OHMs value.
5. Once you have the value, compare the reading to the chart.
6. Check each wire to Chassis ground.
Note: You will still get a resistance reading if one wire has gone to ground.



Temp	Ohms
25° F	27271
30° F	23528
35° F	20348
40° F	17642
45° F	15334
50° F	13360
55° F	11667
60° F	10212
65° F	8959
70° F	7876
75° F	6939
80° F	6126
85° F	5418
90° F	4802
95° F	4264
100° F	3793

Digital Controls Erratic or No Operation

- No Compressor operation

Verify Load Shed (two yellow) wires are not tied together

Try DC volts direct from RV battery, not from converter

Test Low Temperature Protection Device (cold control)

Use a test communication harness

Interference RF (Radio Frequency)

- Florescent lights
- LED lights
- Cell phone charger
- DC brush type motors
- Water purifiers
- Communication harness run close to other wires

DC Volts (Low or Dirty)

Always try straight line DC voltage

Deaden The Coach as last resort!



10 to 5 Button Heat Pump Conversions

Reason: First Generation Heat Pump reversing valve was energized in the cool mode. All current production Heat Pump reversing valves are energized in the heat mode. To get all models on the roof communicating to the same system, a conversion must be complete on new replacement units mixing with older first generation units.

There are two different styles of conversions. Plug-n-Play (mostly Brisk model units) and Pre-installed conversions for Penguin models. The instructions for the two styles are different and there are different conversions for each type of application.

Brisk II Heat Pump – B59186 = Conversion PN: 3313107.119

Penguin II Heat Pump – 65181(X) = Conversion PN: 3313107.107

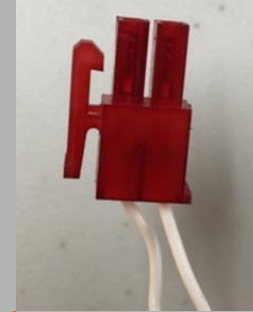
Each Conversion will come with a new 5 Button Control Board (or Box), instructions, and correct outside ambient sensor as these are different from first to second generation.

10 to 5 Button Heat Pump Conversions

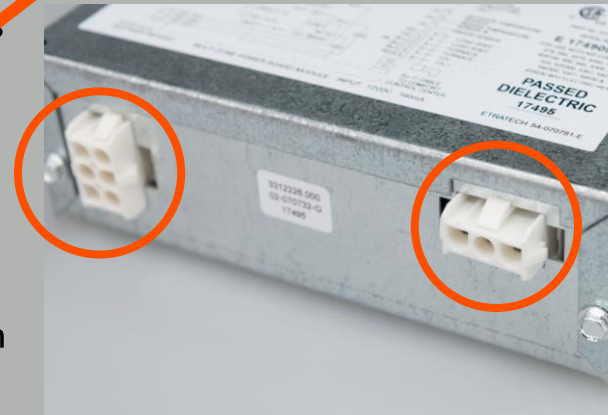
Plug-n-Play

- Both control boards (5 Button & 10 Button) have main power wires to the K6 relay.
 - 120V hot black & blue compressor wire.
 - Second relay on the 5 button board is not used unless you have a heat strip.
- CCC 2 has to physically sense 120V, so there is a neutral and a hot, neutral not needed on the 5 button board. You will remove the white wire from T6 or T7 and tie it to the 2nd wire from the reversing valve (violet wire).
- Conversion kit has a new outdoor temperature sensor that you must use. It is a **RED** 2 pin connector with a yellow ring terminal at the sensor end (this is NOT a ground).
- You have 2 harnesses (Your 6 pin and a 3 pin). Remove the yellow wire from the 6 pin harness and discard.
- Take the yellow wire from the 3 pin harness and insert into the empty space you created in the 6 pin harness.
- Go into the circuit board and take the yellow medium fan speed wire from T2 (Yellow) and move to T4 (violet).

CCC 5 Button



CCC 2

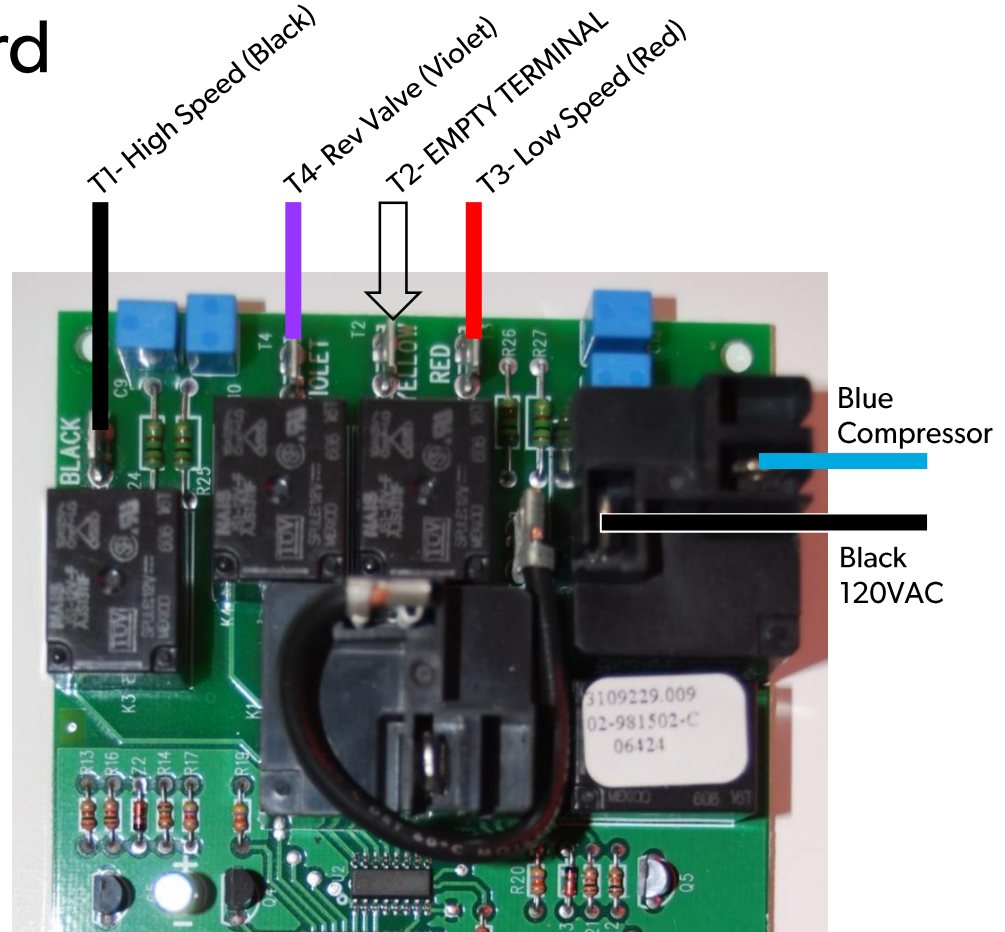


10 to 5 Button Heat Pump Conversions

Pre-installed Control Board

Most of the Fan and Compressor wiring is the same with the exception of a couple of connections.

1. DO NOT utilize the Yellow Medium Fan Speed wire. The wire and the terminal are not used in this conversion.
 - A. Remove **YELLOW WIRE** and cap it.
 - B. The T2 Terminal should **NOT** have any wire connected to it.
2. The original CCC2 (10 button board) had a White Neutral wire on T6 and a Violet Reversing Valve wire on T7.
 - A. Disconnect these two wires and butt splice them together in the conversion process.
3. Replace original Outside Ambient Sensor with new Sensor from Conversion Kit (white wire – red two pin connector).



Any Questions?

- Sales Department (Dealers Only) 1-800-366-3842
- Technical Services (Dealers Only) 1-800-216-5115
- Retail (Retail Customers Only) 1-800-544-4881

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