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# SUNDANZER TROUBLESHOOTING GUIDE

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For DC Household Products



AUGUST 1, 2022  
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## Links to Our Website:

[PURCHASE](#)  
[LED](#)  
[THERMOSTAT](#)  
[ECU](#)  
[CHARGING HOSE](#)  
[REFRIGERANT](#)

[FORM](#)  
[TECHNICAL ASSISTANCE](#)  
[GENERAL QUESTIONS](#)

## 2 INTRODUCTION:

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The SunDanzer troubleshooting guide is a resource to diagnose issues with SunDanzer Products. This guide follows the exact process that SunDanzer technical support will walk customers through. If technical support is contacted, then the process will be the same.



\*This troubleshooting guide is not limited to the pictures of the units above

## 3 TERMINOLOGY:

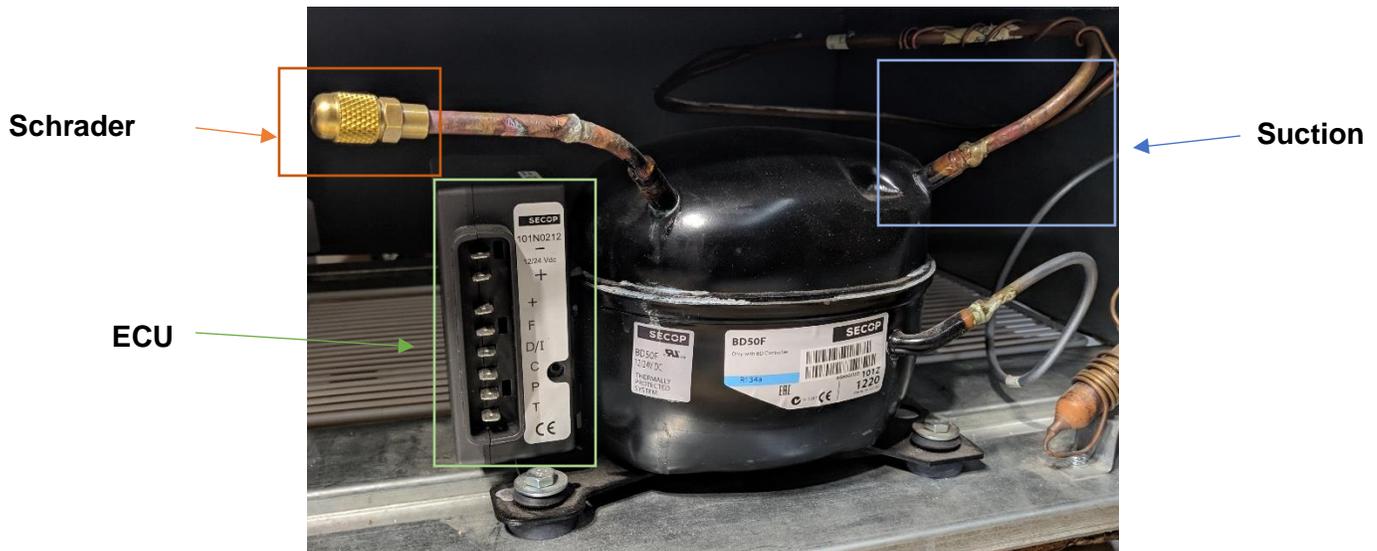
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- a) Compressor: The motor driven piston inside of the fridge that allows for the unit to cool.
- b) ECU: The electronic control unit that is attached to the compressor. This is where all the wires are attached to the compressor. It is also the “brain” of the compressor.
- c) Suction line: The line on the compressor where the refrigerant returns. It is useful when recharging the system.
- d) Schrader Valve: The valve where the refrigerator/freezer is charged from. It has a brass gnarled cap and is attached to the compressor.

## 4 IDENTIFY TYPE OF COMPRESSOR:

### 4.1 TYPE 1) SECOP/DANFOSS

The Secop compressor is the most common type of compressor in SunDanzer products. There are different types of Secop compressors, but they all work the same way, so troubleshooting is always the same. The old name for Secop is Danfoss, so if your SunDanzer Products was bought prior to 2010 there is a chance it has the Danfoss name.



## 4.2 TYPE 2) CASCADE

Cascade compressors were used in the popular SunDanzer DCF390 chest freezer. While the DCF390 is no longer being produced, there are hundreds of them in the field. These compressors are easy to spot, as they have a purple ECU.



## 4.3 TYPE 3) OTHER COMPRESSORS

Throughout the years there have been small runs of SunDanzer units that do not have Secop or Cascade compressors. While they appear to be different, they will almost always operate the same as Secop compressors. Troubleshoot these compressors the same as a Secop compressor.

## 5 HOW TO IDENTIFY YOUR ECU:

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### Secop:

Secop ECUs will be marked on the front. The voltage of the ECU is stated on the front below the identification number.

Secop ECUs come in 12/24V and AC/DC versions. The AC/DC versions can have connections to both AC and 12/24V DC at the same time. The priority is AC power.

[\(Purchase ECU\)](#)



### Cascade:

Cascade ECUs are purple. They do not specify the voltage on the front of the ECU.

SunDanzer typically ships 12/24V Cascade ECUs, but 48V versions are available.

## 5.1 SECOP COMPRESSOR/ECU COMPATIBILITY TABLES

**Old ECU's: If box is unshaded, then the compressor/ECU is compatible**

Compressors		Electronic Units										
		Standard	EMI	Extended EMI	AEO	AEO EMI	Solar	AC/DC conv.	High start	High speed	Automotive	Automotive
		101N0210	101N0220	101N0900	101N0300	101N0320	101N0400	101N0500	101N0230	101N0290	101N0600	101N0630
BD35F mm	101Z0200	UL/CSA	UL/CSA		UL/CSA		UL/CSA	VDE/UL/CSA				
BD35F inch	101Z0204	UL/CSA	UL/CSA		UL/CSA		UL/CSA	VDE/UL/CSA				
BD35K (R600a)	101Z0211											
BD50F mm	101Z1220	UL/CSA	UL/CSA		UL/CSA			VDE/UL/CSA	UL/CSA			
BD50F inch	101Z0203	UL/CSA	UL/CSA		UL/CSA			VDE/UL/CSA	UL/CSA			
BD80F mm	101Z0280											
BD250GH	101Z0400											
BD250GH Twin	101Z0500											
BD100CN (R290)	101Z0401											

**VDE/UL/CSA** = Combination possible, VDE or UL or CSA approval

= Combination possible, but no approval

= Combination not possible

**New ECU's: If box is unshaded, then the compressor/ECU is compatible**

Compressors		Electronic Units						
		Standard	AEO	High speed	Solar	AC/DC converter	Automotive	Telecommunication
		101N0212	101N0340	101N0390	101N0420	101N0510	101N0650	101N0732
BD35F mm	101Z0200		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F inch	101Z0204		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F-B	101Z0205		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F-HD.2	101Z0216						UL / CB / VDE	
BD35K (R600a)	101Z0211		UL / CB / VDE		CB / VDE	CB / VDE	UL / CB / VDE	
BD50F mm	101Z1220		UL / CB / VDE			UL / VDE	UL / CB / VDE	
BD50F inch	101Z0203		UL / CB / VDE			UL / VDE	UL / CB / VDE	
BD50K (R600a)	101Z0213							
BD80F	101Z0280							
BD80CN (R290)	101Z0403		UL / CB / VDE			UL	UL / CB / VDE	
BD100CN (R290)	101Z0401							
BD250GH.2 (12/24V)	101Z0406							
BD250GH.2 (48V)	101Z0405							UL

**UL / CB / VDE** = Combination possible, UL, CB or VDE approval

= Combination possible, but no approval

= Combination not possible

## 6 TROUBLESHOOTING STEPS:

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### 6.1 STEP 1: CHECK COMPRESSORS

#### 6.1.1 Path 1: Electrical Components: The compressor is not running (place hand on compressor to determine)

- a) Check the thermostat using this guide ([Thermostat Check and Replacement](#)). If problem persists, refer to next step.
- b) Make sure that the issue is not your power supply. Most of the time there is a bad connection from the battery to the fridge. After checking the connections refer to step two if the problem persists.

#### 6.1.2 Path 2: Refrigeration Components: The compressor is running continuously, but the refrigerator/freezer is not cold, or it is too cold (Power draw will be more than usual)

**OR**

**The compressor is running normally, but the refrigerator/freezer is not becoming cold enough or, it is too cold**

- a) Check the thermostat using this guide ([Thermostat Check and Replacement](#)). If problem persists, refer to next step.
- b) The refrigerator/freezer does not have enough refrigerant. Charge the refrigerator using this guide ([How to Charge a SunDanzer Refrigerator/Freezer](#)) or hire a refrigeration technician.

## 6.2 STEP 2: LED FAULT CODES

### 6.2.1 Error Codes: Secop Compressors

Error codes are shown on a small red LED inside of the compressor compartment of your fridge/freezer. If the fridge is not running and the LED is not flashing, then make sure the LED is connected correctly via this diagram ([LED connection diagram](#)).



If you do not have an LED purchase one from our website ([LED Purchase](#)). You can also use a normal 5V LED with quick connects.

You can also source your own 5V LED. You can troubleshoot a SunDanzer product without an LED, but you will need to use the guess and check method. Refer to STEP 3 if you are using the guess and check method.

### 1 Flash: Low Voltage

Low voltage is measured at the ECU terminals (large + and -), so the issue is not the fridge itself. Low voltage is triggered when the ECU reads below 10.4V (12v systems), 22.8V (24V systems). Consumer multimeters usually cannot read short voltage drops, caused in power surges on startup.

#### Fixing methodology:

- a) Measure the voltage at the ECU to have an accurate starting measurement.
- b) Check the connections upstream from the ECU. Check crimps, connectors, plugs, and breakers. Make sure all connections are solid feeling and do not wiggle.

- c) Check the voltage at the batteries to see if there is a voltage drop from there to the ECU. Keep in mind that 0.1V does matter when dealing with ECU's
- d) Make sure that your wire gauge is 12AWG or thicker. 14AWG will work for distances below 10 feet if you have a small fridge or freezer.

## **2 Flash) Overload of the Fan Terminal**

This error code can be deceiving. The intended purpose is to tell the user that the small + and the F terminal are overloaded. This means that something connected to the terminals is drawing too much power. Almost all SunDanzer household products do not have anything connected to these terminals, so it leaves a few options.

### **Fixing methodology:**

- a) There is a short in the wiring. Check all the connectors attached to the ECU. Make sure that all the connectors are separated by an air gap if connected to separate terminals.
- b) Has been known to mean the same as the 3 Flash error. See 3 Flash.

## **3 Flash) Compressor Cannot Start**

This is the most common error code that occurs. Typically, it occurs when the compressor has low voltage, and it tries to start too many times in a row without success. The error code will then change from a 1 flash to a 3 flash.

### **Fixing methodology:**

- a) Refer to 1 flash and complete tests.
- b) The electronics are faulty, and the ECU must be replaced. While a rare occurrence it does happen occasionally if in a dirty environment or when over 10 years old.
- c) The system is overcharged, and the compressor cannot overcome the high pressures. This will only happen if you charged the system yourself incorrectly. This reason is rare.
- d) The compressor is seized and cannot start. At this point you need to replace the compressor. This has never happened to a SunDanzer product, but it is possible.

## **4 Flash) Compressor Cannot Maintain Minimum speed**

- a) Check the thermostat using this guide ([Thermostat Check and Replacement](#)). If problem persists, refer to b).
- b) Contact SunDanzer Technical Support ([Technical Assistance Form](#))

## **5 Flash) Electronics Have Exceeded Temperature Limit**

- a) Check the thermostat using this guide ([Thermostat Check and Replacement](#)). If problem persists, refer to b).
- b) The electronics are faulty, and the ECU must be replaced. While a rare occurrence it does happen occasionally if in a dirty environment or when over 10 years old Make sure you buy the proper ECU, or it will not work. If you are unsure about your compressor type, send an email to [info@SunDanzer.com](mailto:info@SunDanzer.com) with a picture of the compressor to verify.

c) Contact SunDanzer Technical Support ([Technical Assistance Form](#))

## 6.2.2 Error Codes: Cascade Compressors (Purple ECU)

### 1 Flash) Motor fault

Refer to Secop 3 Flash

### 2 Flash) Under Voltage

Refer to Secop 1 flash

### 3 Flash) Over Voltage

Voltage is too high for some reason. Lower the voltage with a DC-DC converter or adjust power supply accordingly.

### 4 Flash) Over Temperature

Refer to Secop 5 flash

### 5 Flash) Over Current/Power

Refer to Secop 5 flash

## 6.3 STEP 3: GUESS AND CHECK METHOD (USE THIS IF YOU DO NOT HAVE AN LED)

- a) **Thermostat error:** Check the thermostat using this guide ([Thermostat Check and Replacement](#)).
- b) **Low voltage error:** A low voltage problem is the most common problem consumers have with SunDanzer products. Low voltage is measured at the ECU terminals (large + and -). Low voltage is triggered when the ECU reads below 10.4V (12v systems), 22.8V (24V systems). Bad connections or batteries that are not fully charged are usually the culprit. Check battery voltage to make sure they are fully charged.

To diagnose a bad connection, you will need to check the voltage at the ECU and the voltage at the batteries. If there is a discrepancy in the voltage between the batteries and ECU, then there is a bad connection. A bad connection will increase the resistance in the system, thus creating a voltage drop. Make sure wire gauge is 12AWG or thicker.

- c) **Seriously, Make Sure it is Not a Power System Issue.** Statistically the low voltage problem is the issue 90% of the time (we keep track).



## 8 HOW TO REMOVE/INSTALL A SUNDANZER THERMOSTAT

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### **Time to Complete:**

10-15min

### **Tools:**

- Phillips-head screwdriver
- 14mm socket or 9/16” socket
- Needle-nose pliers



### **Materials:**

- New Thermostat ([Buy Thermostat](#))

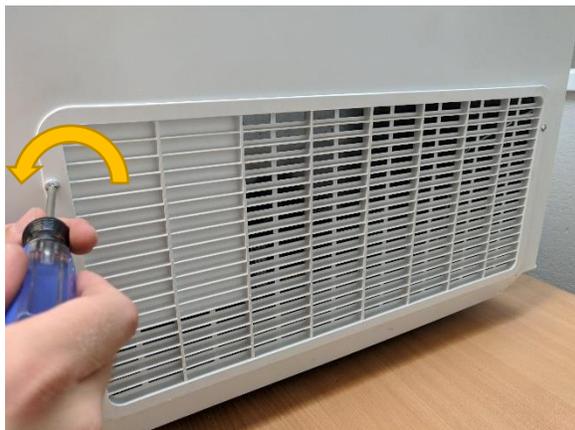
### **Determine Faceplate Style:**

#### **Style 1:**



**Style 2:****8.1.1 Instructions for Style 1****Remove Thermostat:**

Step 1) Remove the side/back plate of the refrigerator with a screwdriver.



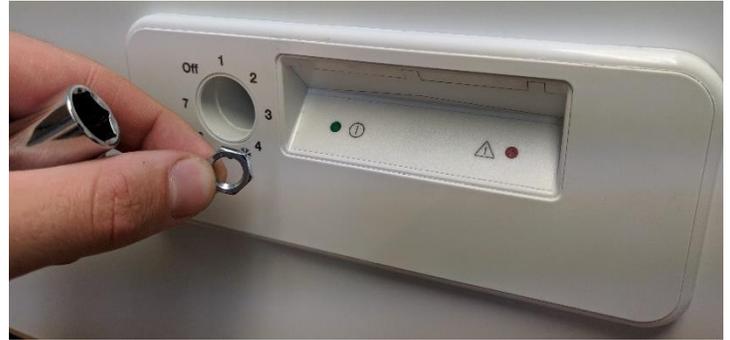
Step 2) Pull out thermostat wire from inside of the fridge.



Step 3) Take knob out. Use a screwdriver to push knob out from behind.



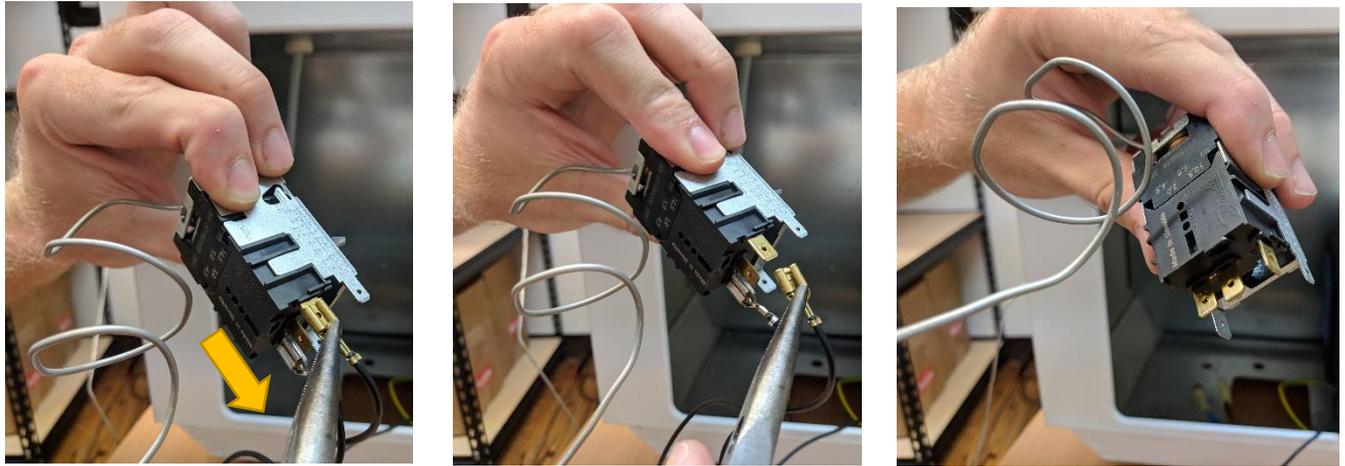
Step 4) Use 14mm socket or 9/16" socket to remove thermostat nut. You may have to use needle nose pliers, as some sockets do not fit.



Step 5) Remove thermostat from the inside of the fridge.

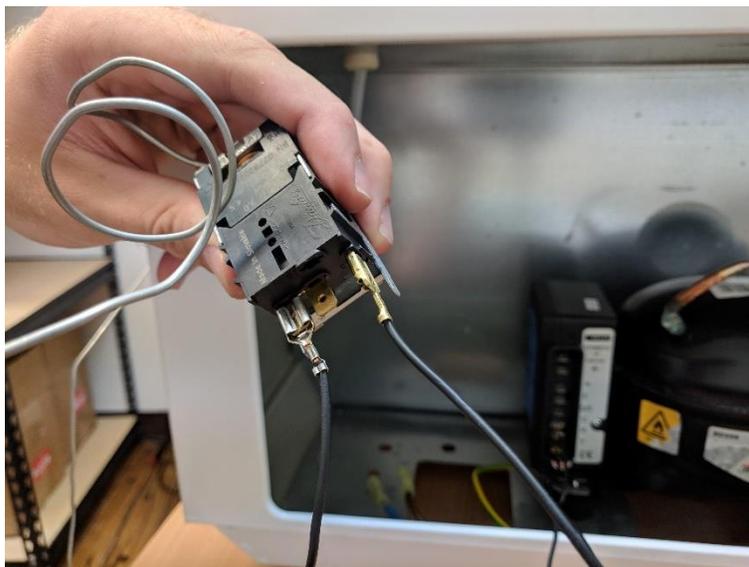


Step 6) Remove wires from thermostat with needle nose pliers. Grab by the connector.

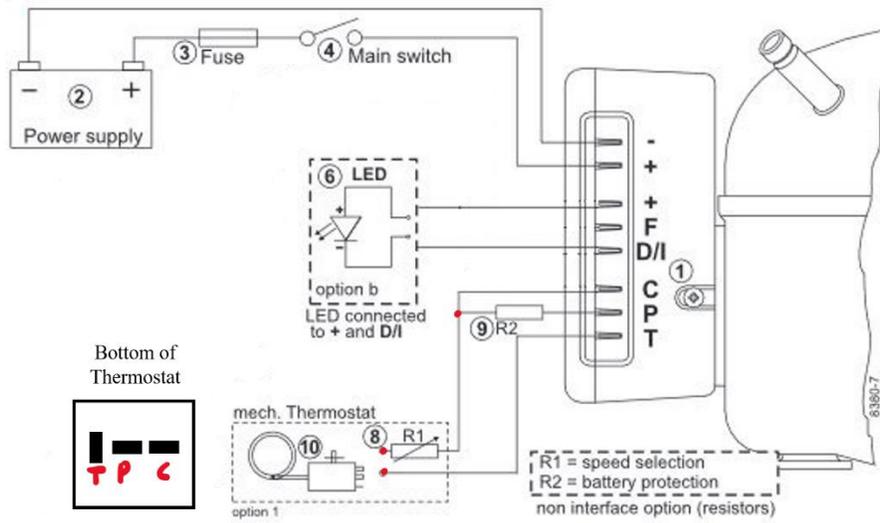


**Install Thermostat:**

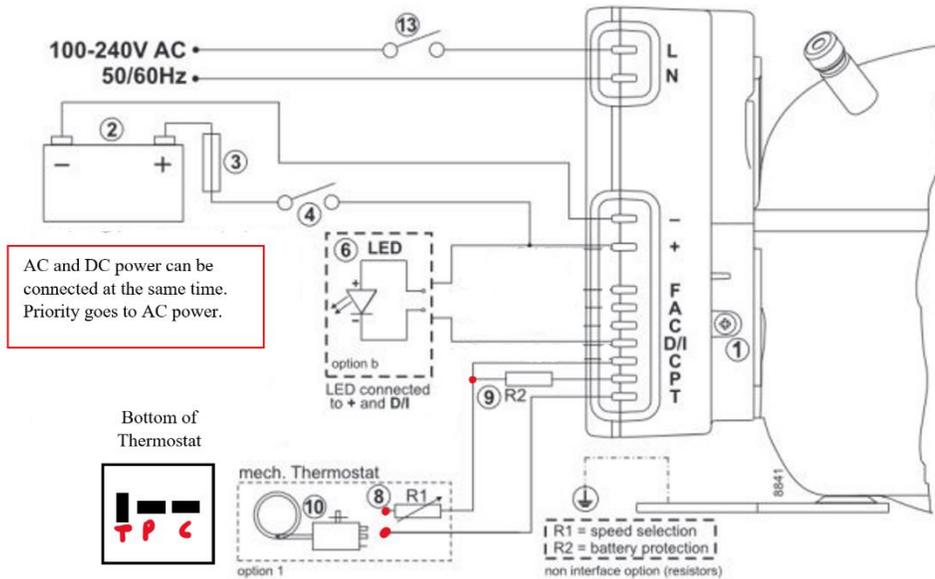
Step 7) Connect thermostat wires. Wiring diagram is below.



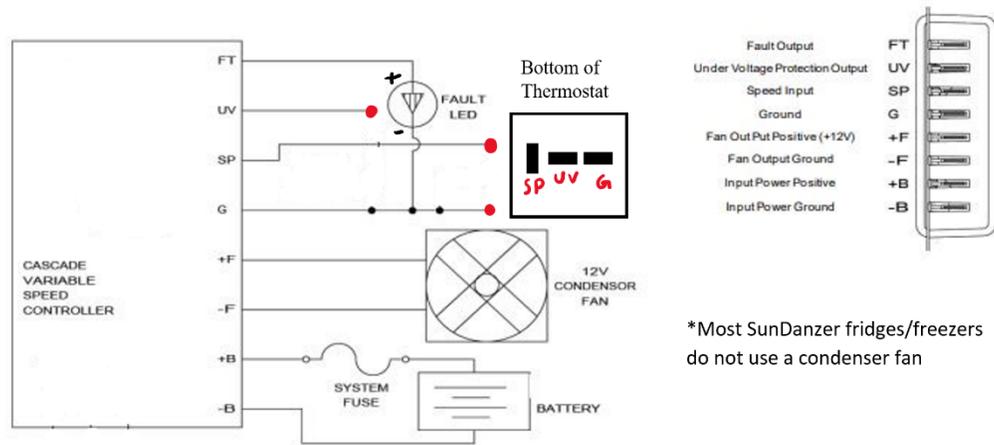
## SECOP 101N0212 ECU



## SECOP 101N0510 AC/DC ECU

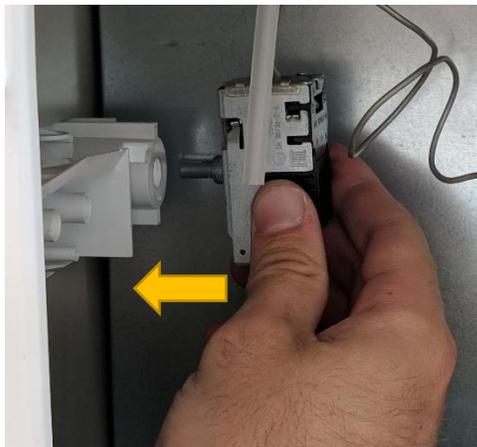


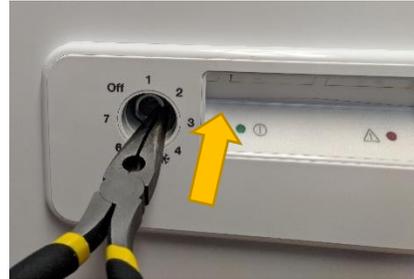
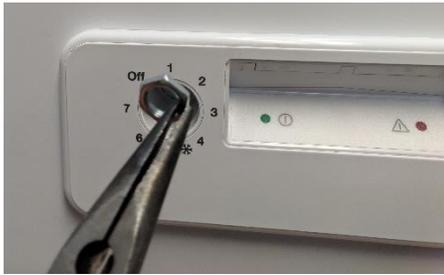
## Cascade 17 ECU



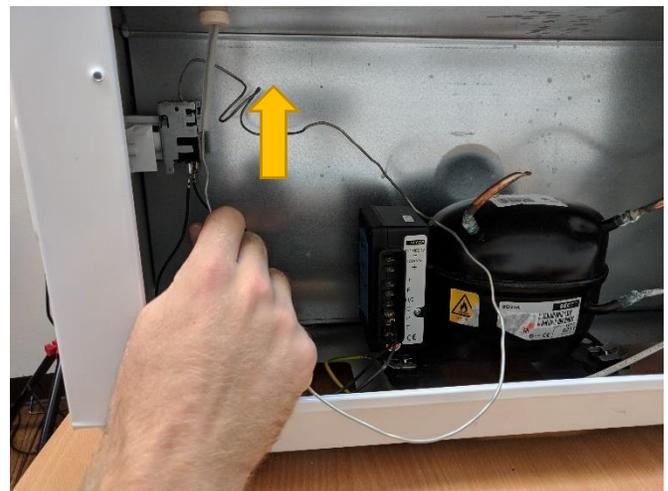
\*Most SunDanzer fridges/freezers do not use a condenser fan

Step 8) Install thermostat with 14mm or 9/16" socket. You may have to use needle nose pliers, as some sockets do not fit. Make sure thermostat is aligned correctly. Hold on to the thermostat while installing nut.

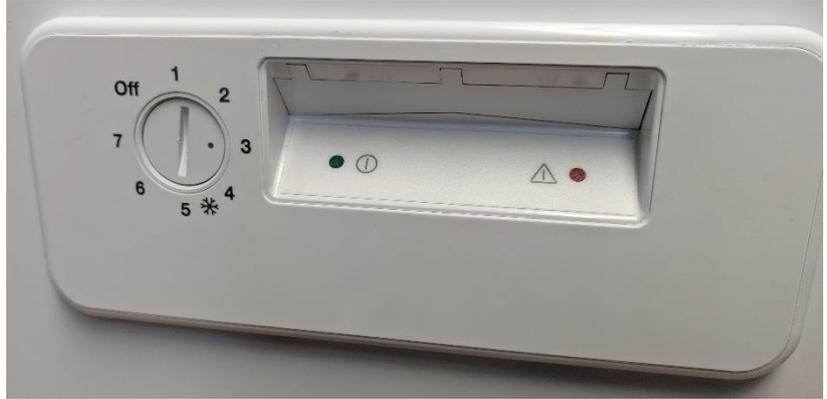




Step 9) Push thermostat wire into fridge tube. Go until the thermostat wire bottoms out.



Step 10) Install thermostat knob.



## 8.1.2 Instructions for Style 2

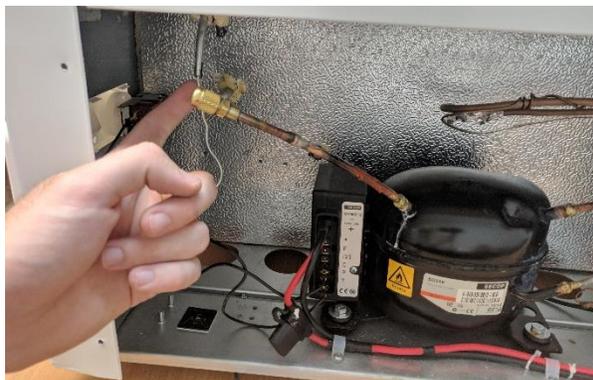


### Remove Thermostat:

Step 1) Remove the side/back plate of the refrigerator with a screwdriver.



Step 2) Pull out thermostat wire from inside of the fridge.

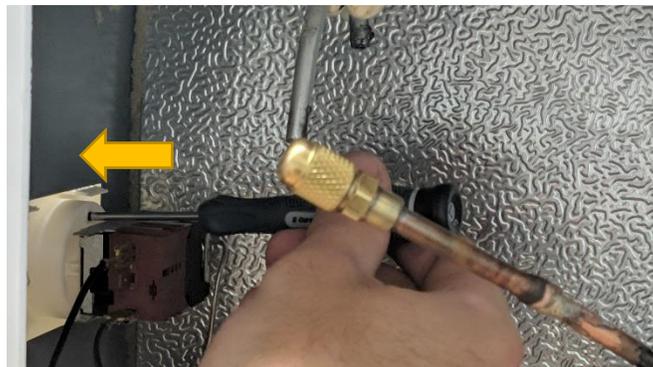




Step 3) Remove knob by pulling.



Step 4) If knob is stuck, then use small screwdriver to push it off from the back. There is a hole near the thermostat to do so.



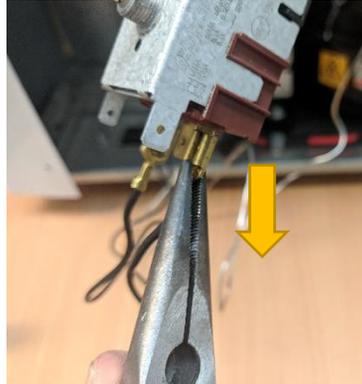
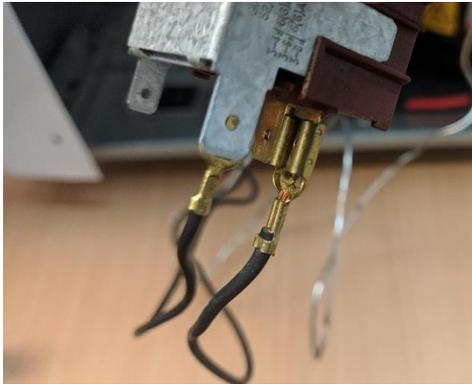
Step 5) Use 14mm socket or 9/16" socket to unscrew thermostat nut.



Step 6) Remove thermostat from inside of fridge.

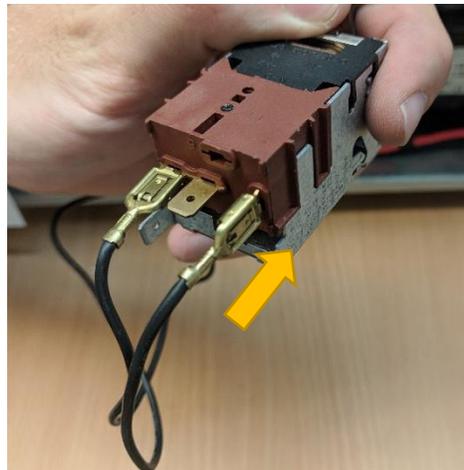
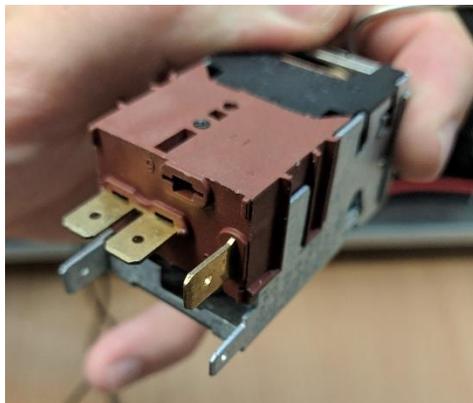


Step 7) Remove wires from thermostat with needle nose pliers. Grab by the connector.

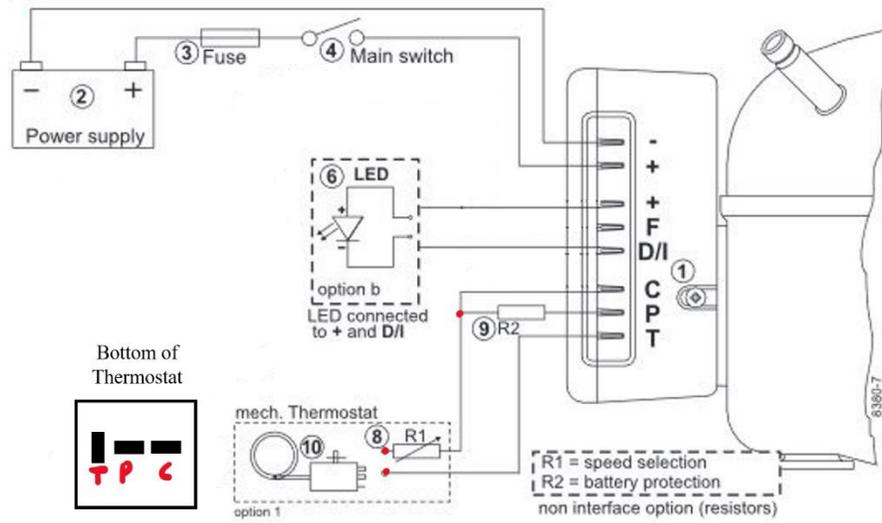


**Install Thermostat:**

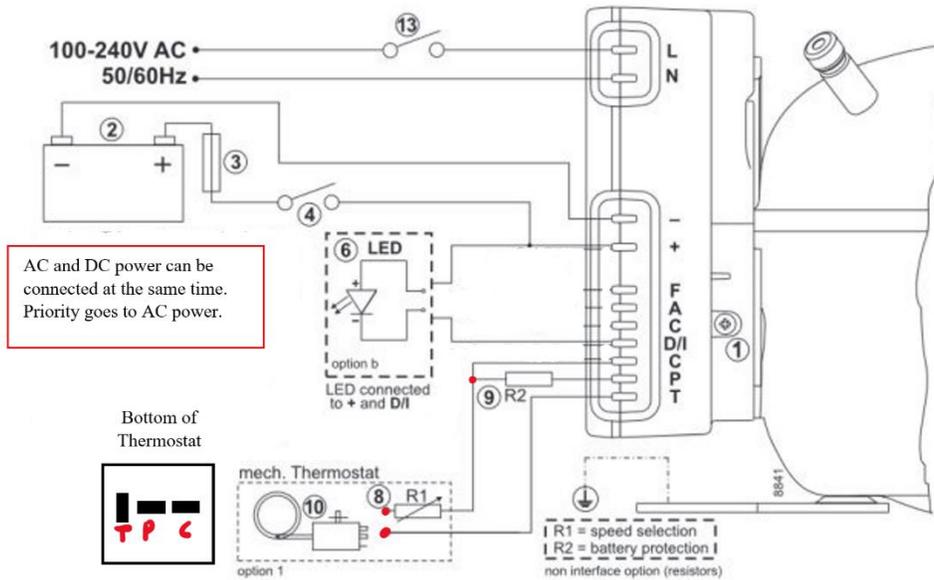
Step 8) Connect thermostat wires. Wiring diagram is below.



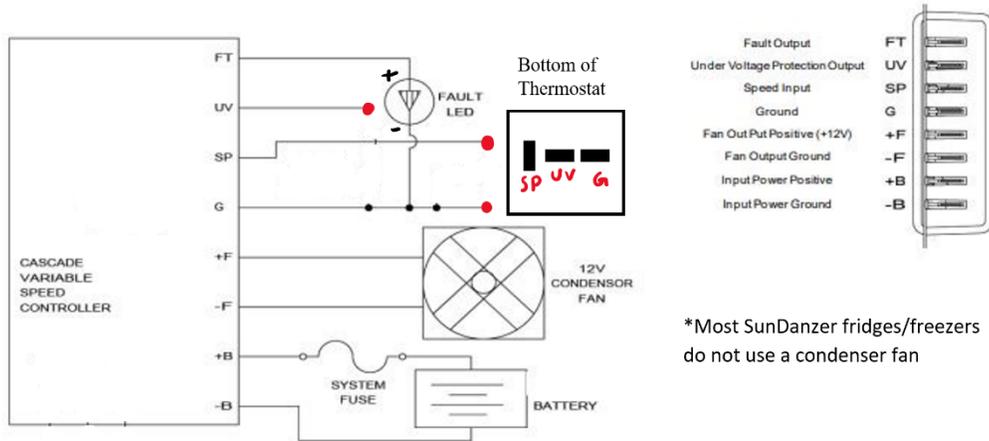
## SECOP 101N0212 ECU



## SECOP 101N0510 AC/DC ECU



## Cascade 17 ECU

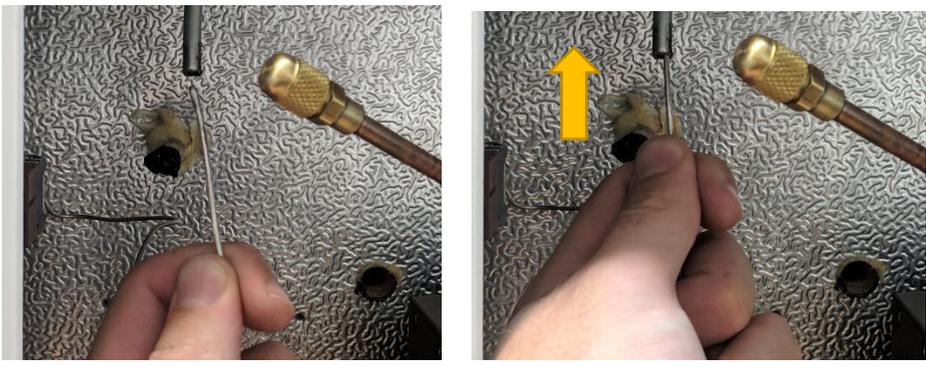


\*Most SunDanzer fridges/freezers do not use a condensor fan

Step 9) Install thermostat with 14mm socket, make sure thermostat is aligned correctly. Hold thermostat from the back while installing nut.



Step 10) Push thermostat wire into fridge tube. Go until the thermostat wire bottoms out.



Step 11) Install thermostat knob.



## 9 HOW TO REMOVE/INSTALL A SUNDANZER ECU

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### **Time to Complete:**

5-10min

### **Tools:**

- Phillips-head screwdriver
- Needle-nose pliers

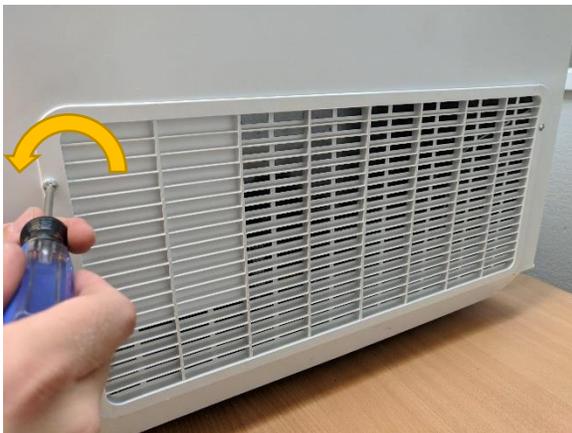


### **Materials:**

- New ECU (Look at old ECU, determine type, and purchase here [Buy ECU](#))

### **Steps before you begin:**

Step 1) Remove side/back cover

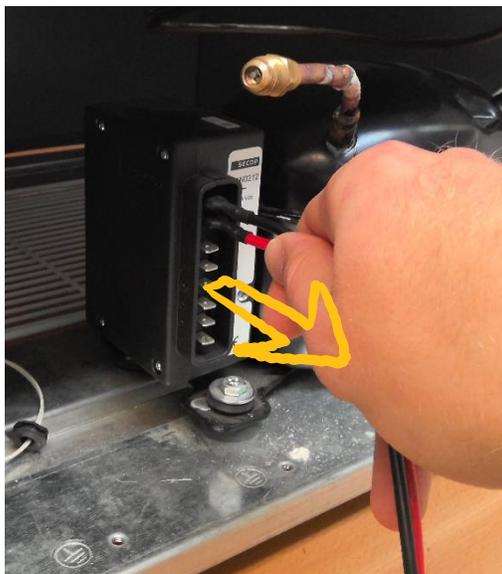


Step 2) Take a picture of your wiring for future reference



Step 3) Disconnect refrigerator/freezer from power

Step 4) Unplug wires from old ECU



Step 5) Screw in ECU screw(clockwise). This will allow you to take off the ECU without taking off the screw.



Step 6) Separate ECU from compressor. Take off screw side first.



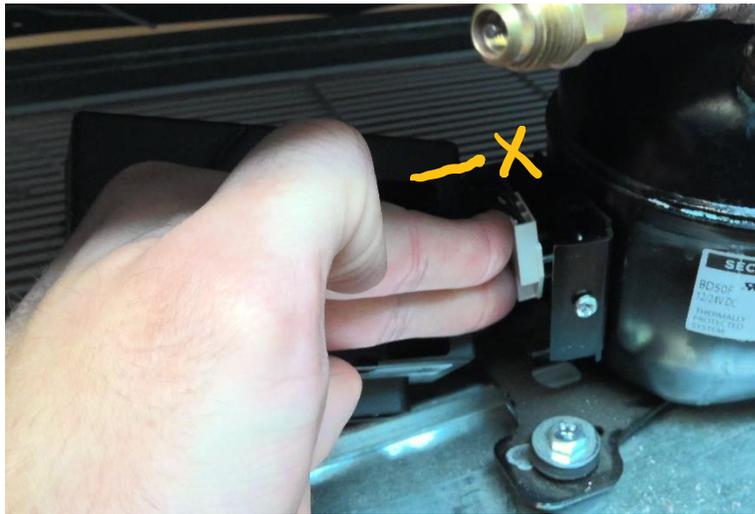
Step 7) Take off ECU plug from compressor. You may need to use a screwdriver to pry it loose.



Step 8) Set aside old ECU and grab new ECU.

Step 9) Connect ECU plug to compressor. Make sure the orientation matches with the picture below. **IMPORTANT:** Make sure plug is fully seated.





Step 10) Put ECU back on compressor. You may have to push hard.



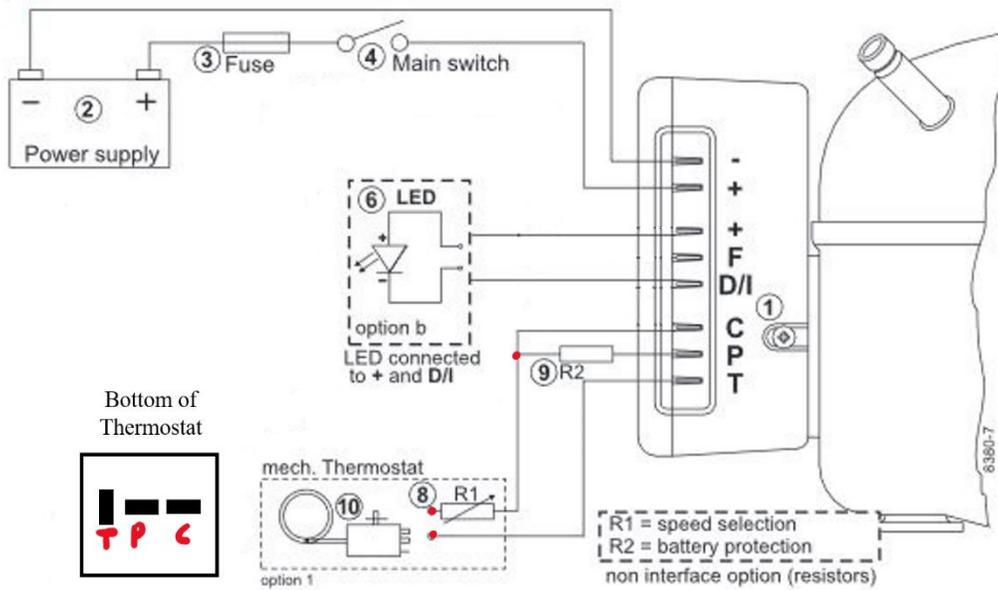
Step 11) Screw out ECU screw to fasten the ECU to the compressor. (Counter-clockwise)



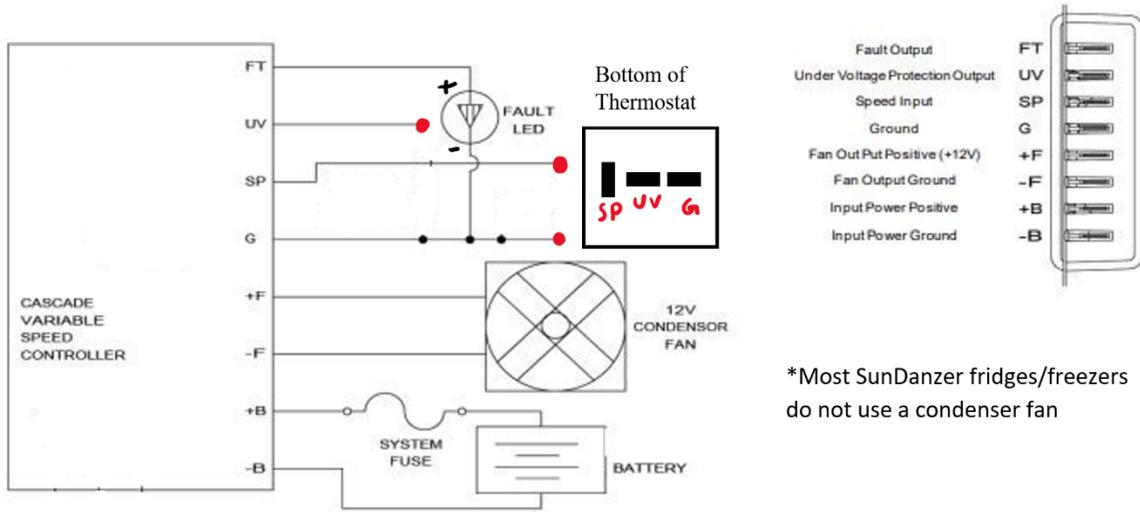
Step 12) Reconnect wires to ECU. Make sure they are the same as before based on picture taken. Example wiring diagram is also below.



# SECOP 101N0212 ECU

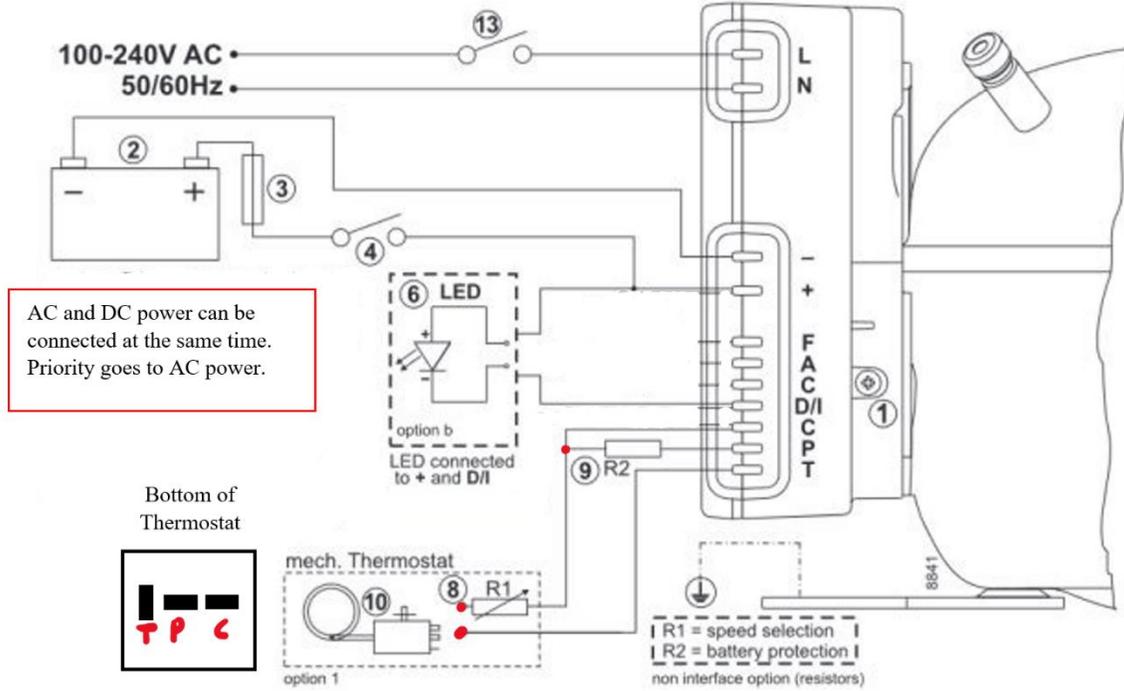


# Cascade 17 ECU



\*Most SunDanzer fridges/freezers do not use a condenser fan

## SECOP 101N0510 AC/DC ECU



Step 12) Plug in refrigerator to make sure it works. If it doesn't, then you still have an electrical issue.

Step 13) Install side/back cover

## 10 HOW TO CHARGE A SUNDANZER PRODUCT

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### **Time to Complete:**

20-60min

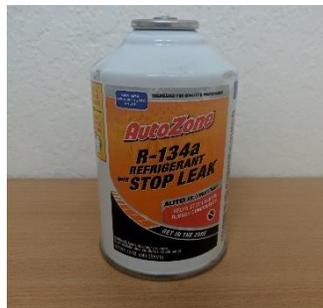
### **Tools:**

- Phillips-head screwdriver
- Charging Hose ([Purchase Charging Hose](#))
- Something to short ECU



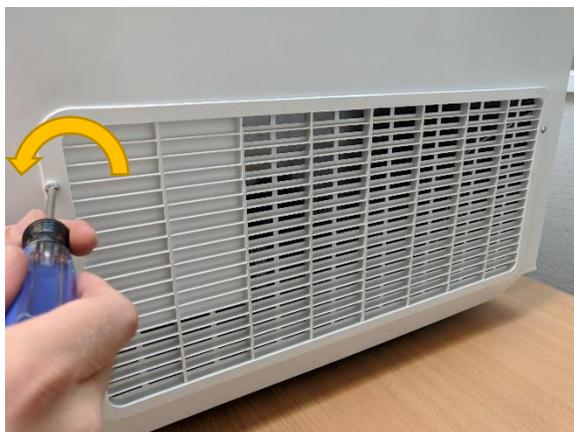
### **Materials:**

- Refrigerant (Type is determined in “Steps before you begin”)



### **Steps before you begin:**

Step 1) Remove side/back cover



## Step 2) Determine refrigerant type

Look at compressor sticker to determine refrigerant type.



## Step 3) Look to see if there is a Schrader valve

There will be a brass cap on the valve. \*Purchase a piercing valve if you do not have a Schrader valve.



\*SunDanzer does not recommend using a piercing valve, as they can lead to leaks if not properly used. Do research on proper installation of the piercing valve. For best operation, have a refrigeration technician charge your fridge.

[Link to Table of Contents](#)

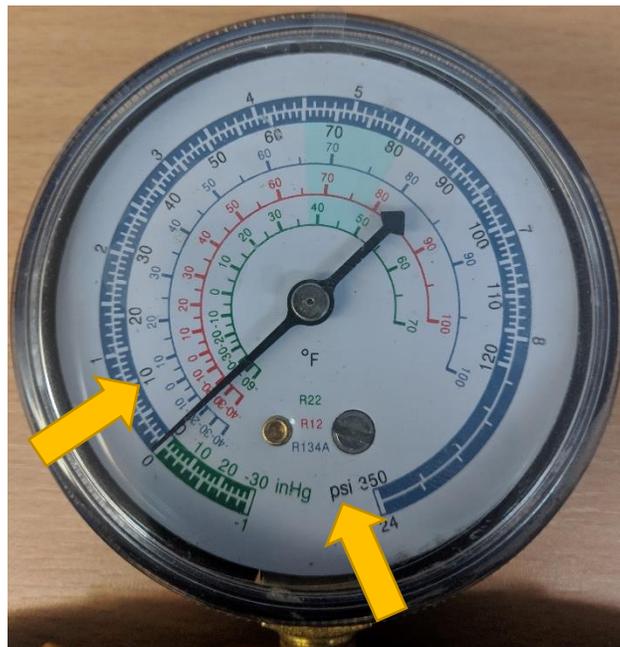
Step 4) Purchase refrigerant. Make sure the can is self-sealing if bought from a source other than SunDanzer. The refrigerant does not need to have stop leak in it. From our experience stop leak only works some of the time. Buy from an auto parts store to get a better price ([Buy Refrigerant from SunDanzer](#))



### **Time to charge:**

Step 1) Become familiar with the gauge

The inside of the outer ring is PSI, which is what you want to use to charge your fridge.



Type of SunDanzer Unit	PSI (R134a)	PSI (R290)
Refrigerator	15-25	40-50
Freezer	5- 10	20-30
Refrigerator/Freezer	15-25	40-50

\*\* If a refrigeration technician charges the system, they can use the back label on the fridge/freezer for charge level.

Step 2) Locate suction line for charging

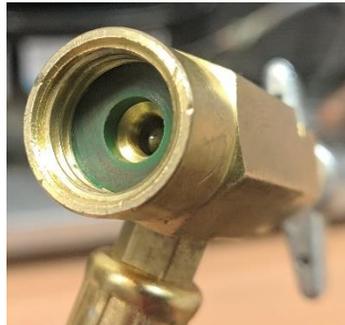


The suction line is where the refrigerant is returned to the compressor. If the system is overcharged the suction line will feel very cold. It may have frost on the outside. When the refrigerator is charged correctly, the suction line feels cool to the touch (think refrigerator temperatures). When the system is charged too little, then the suction line will be warm

Touch the suction line about 2" from the compressor body



Step 3) Screw out puncture tap on hose. You will puncture the can prematurely if you don't do this. Look at the picture below.



Step 4) Screw can onto hose. Make sure it is tight.



Step 5) Screw hose onto compressor



## Step 6) Force compressor to run

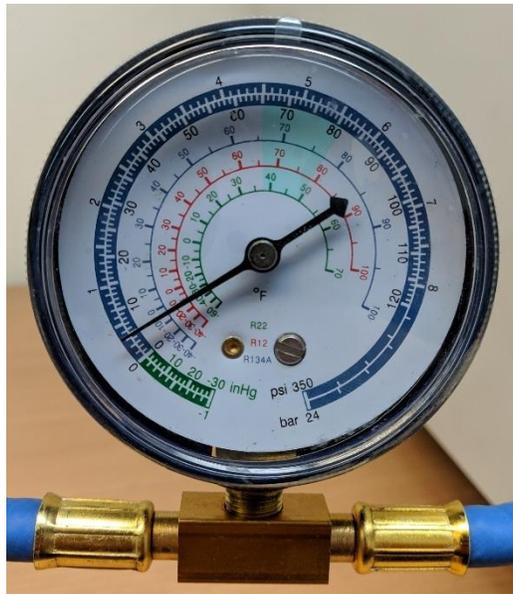
You will need to bypass the thermostat to force the compressor to run. To do this you will need to short the thermostat terminals together on the ECU. The two terminals on Secop ECU's that need to be shorted together are the C & T terminals. The terminals on the Cascade ECU will be the terminals T+ & T-. Use a piece of wire to do so. You will need to disconnect the thermostat wires from the C & T terminals before adding the shorting wire. An example of the wire is below.

You can also be able to turn the thermostat to the coldest position to force the compressor to run.

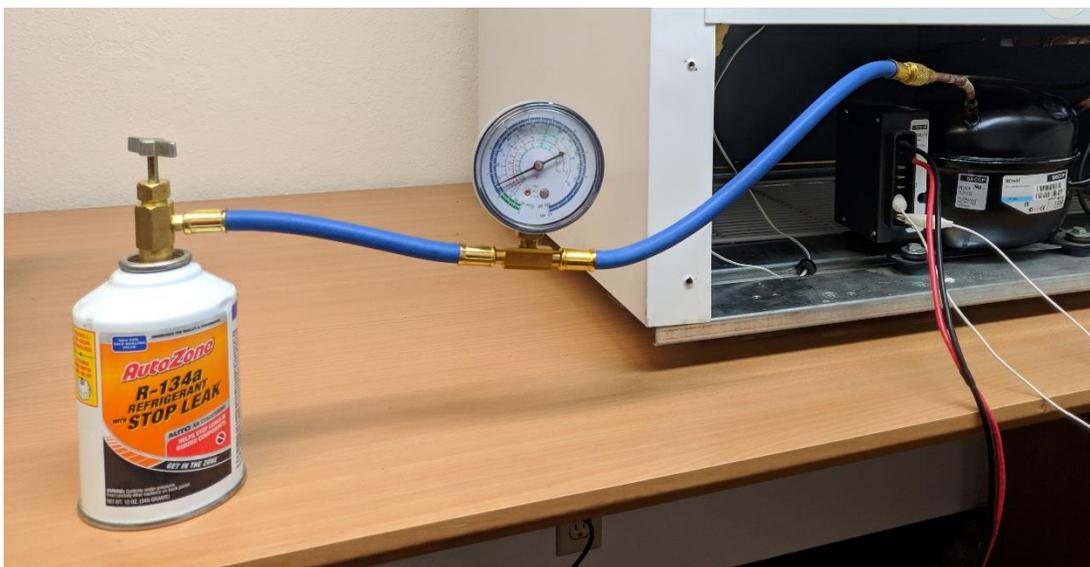


Step 7) Look at pressure of system at equilibrium (needle it will stop moving). **Below is an example of a system that is charged. Follow the table for your specific charge.**

If the system is close to 0 PSI, then you need to add refrigerant.



Step 8) Make sure can is upright



Step 9) Screw in tap to release gas into the system for 10 seconds. You will feel the can of refrigerant become cold when gas is leaving it. The Pressure will go up in the system.



Step 10) Unscrew tap and wait for the system to come to equilibrium (must be running). A system has reached equilibrium when the pressure no longer changes. Equilibrium will take about 5-15min to reach.



Step 11) Check the pressure on the gauge at equilibrium.

Type of SunDanzer Unit	PSI (R134a)	PSI (R290)
Refrigerator	15-25	40-50
Freezer	5- 10	20-30
Refrigerator/Freezer	15-25	40-50

Step 12) Repeat 10 second bursts of refrigerant until desired pressure is reached  
Repeat from step 8.

Step 13) Touch suction line to determine if the system is overcharged **VERY IMPORTANT**

The suction line is where the refrigerant is returned to the compressor. If the system is overcharged the suction line will feel very cold. It may have frost/ice on the outside. When the refrigerator is charged correctly, the suction line feels cool to the touch (think refrigerator temperatures). When the system is charged too little, then the suction line will be warm.

Touch the suction line about 2” from the compressor body



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Step 14) If overcharged, let refrigerant out. Press in the Schrader valve to let a little refrigerant out. You may need something slim to press in valve pin.



Step 15) Let unit run normally. Set the thermostat to the middle setting. If you have a thermometer, place inside fridge/freezer to check temperature. The FDA recommends 40F for refrigerators and 0F for Freezers.



### Step 16) Remove Hose from Schrader valve



### Step 17) Unscrew can from hose. Store the refrigerant in a safe place.



### Step 18) Rejoice!

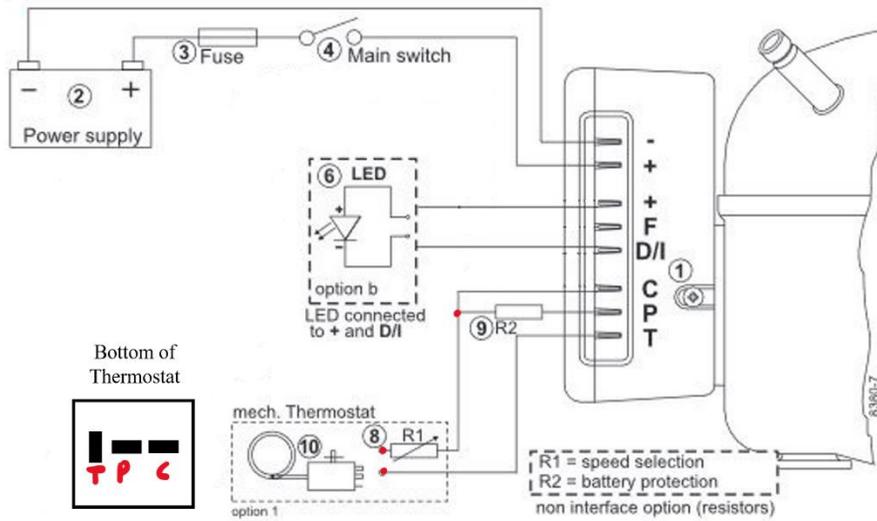
#### Potential Problems:

- The system is overcharged, so the compressor cannot run. This can be seen, as the compressor will have a three-flash error code.
- Schrader depressor in the hose does not push down Schrader valve, so you cannot charge the system.

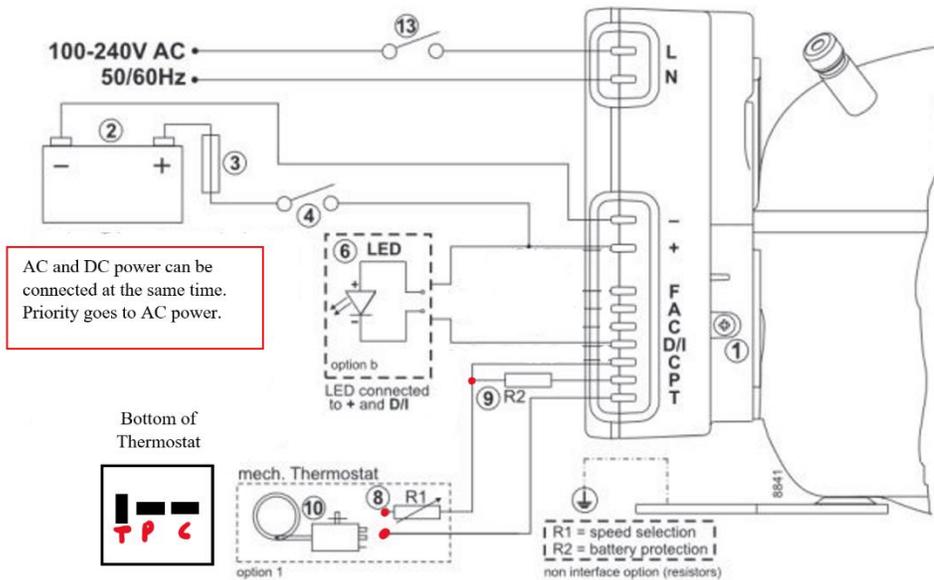
# 11 APPENDIX

## 11.1.1 Wiring Diagrams:

### SECOP 101N0212 ECU

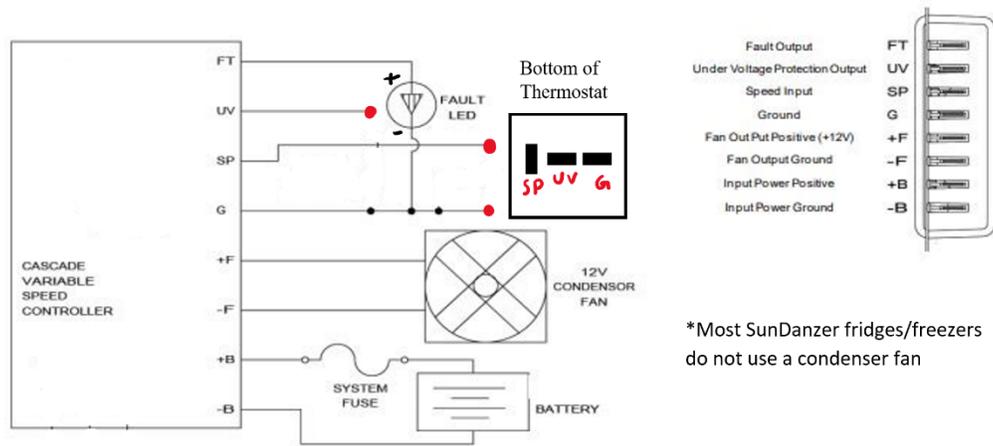


### SECOP 101N0510 AC/DC ECU



AC and DC power can be connected at the same time. Priority goes to AC power.

## Cascade 17 ECU



### 11.1.2 Secop Compressor/ECU Compatibility Tables

**Old ECU's: If box is unshaded, then the compressor/ECU is compatible**

Compressors		Electronic Units										
		Standard	EMI	Extended EMI	AEO	AEO EMI	Solar	AC/DC conv.	High start	High speed	Automotive	Automotive
		101N0210	101N0220	101N0900	101N0300	101N0320	101N0400	101N0500	101N0230	101N0290	101N0600	101N0630
BD35F mm	101Z0200	UL/CSA	UL/CSA		UL/CSA		UL/CSA	VDE/UL/CSA				
BD35F inch	101Z0204	UL/CSA	UL/CSA		UL/CSA		UL/CSA	VDE/UL/CSA				
BD35K (R600a)	101Z0211											
BD50F mm	101Z1220	UL/CSA	UL/CSA		UL/CSA			VDE/UL/CSA	UL/CSA			
BD50F inch	101Z0203	UL/CSA	UL/CSA		UL/CSA			VDE/UL/CSA	UL/CSA			
BD80F mm	101Z0280											
BD250GH	101Z0400											
BD250GH Twin	101Z0500											
BD100CN (R290)	101Z0401											

**VDE/UL/CSA** = Combination possible, VDE or UL or CSA approval

= Combination possible, but no approval

= Combination not possible

**New ECU's: If box is unshaded, then the compressor/ECU is compatible**

Compressors		Electronic Units						
		Standard	AEO	High speed	Solar	AC/DC converter	Automotive	Telecommunication
		101N0212	101N0340	101N0390	101N0420	101N0510	101N0650	101N0732
BD35F mm	101Z0200		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F inch	101Z0204		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F-B	101Z0205		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F-HD.2	101Z0216						UL / CB / VDE	
BD35K (R600a)	101Z0211		UL / CB / VDE		CB / VDE	CB / VDE	UL / CB / VDE	
BD50F mm	101Z1220		UL / CB / VDE			UL / VDE	UL / CB / VDE	
BD50F inch	101Z0203		UL / CB / VDE			UL / VDE	UL / CB / VDE	
BD50K (R600a)	101Z0213							
BD80F	101Z0280							
BD80CN (R290)	101Z0403		UL / CB / VDE			UL	UL / CB / VDE	
BD100CN (R290)	101Z0401							
BD250GH.2 (12/24V)	101Z0406							
BD250GH.2 (48V)	101Z0405							UL

**UL / CB / VDE** = Combination possible, UL, CB or VDE approval

= Combination possible, but no approval

= Combination not possible