

DC HOUSEHOLD FRIDGES & FREEZERS

Troubleshooting Guide

Find and fix the most common problems in a few minutes: power checks, fault-light codes, thermostat and controller replacement.



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Start here

About **9 in 10** problems we see are low voltage: a loose connection or a battery that is not fully charged. Check the power first (Step 1) before you replace any parts.

Prefer to click through?

The same steps as a short interactive guide:
sundanzer.com/troubleshooting-guide-2

Parts and help

What	Where
Thermostat	Buy a thermostat
Controller (ECU)	Buy a controller
Fault-light LED, other parts	Parts & accessories
Technical help	Technical assistance form
General questions	Send us a message
Email	info@sundanzer.com

Email is the fastest way to reach us. You can also call (520) 882-9100 and leave a message.

01 Before you start

This guide helps you find and fix problems with SunDanzer DC household refrigerators and freezers. It follows the same steps our technical support team walks customers through, so if you contact us we will ask about the same checks.



The steps apply to all SunDanzer DC household units, not only the models pictured.

What you may need

- A multimeter to measure DC voltage
- Phillips-head screwdriver
- Needle-nose pliers
- 14 mm or 9/16 in socket (thermostat only)
- A short piece of wire (thermostat test)

Stay safe

- Disconnect power before you unplug or connect wires, except during a test that asks you to keep it powered.
- These units run on low-voltage DC, but a battery can still deliver a large current. Keep tools away from the battery terminals.
- Never open the sealed refrigerant system yourself. See [Refrigerant problems](#).

Words used in this guide

Compressor

The motor-driven pump in the back of the unit that makes it cool.

Controller (ECU)

The electronic control unit clipped to the side of the compressor. All the wires connect here, and it is the "brain" of the compressor.

Thermostat

The temperature control behind the knob. It tells the controller when to run the compressor.

Fault light (LED)

A small red light wired to the controller that flashes a code when something is wrong.

Suction line

The copper pipe where refrigerant returns to the compressor. Touching it tells you whether the refrigerant charge is about right.

Schrader valve

The service valve with a brass, ribbed cap on the compressor pipework. Only a refrigeration technician should use it.

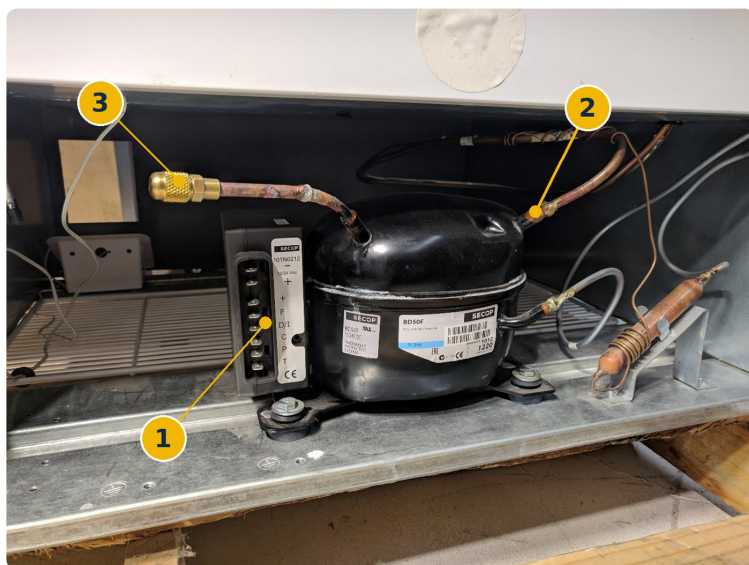
02

Identify your compressor and controller

Take off the side or back cover and look at the compressor. Knowing which type you have tells you which fault codes and parts apply.

Type 1: Secop (formerly Danfoss)

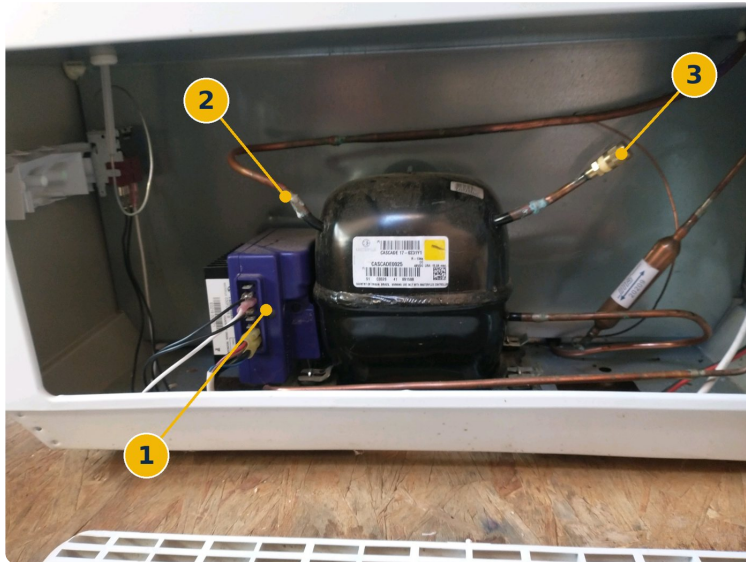
Secop is the most common compressor in SunDanzer units. There are several Secop models, but they all troubleshoot the same way. Secop used to be called Danfoss, so a unit bought before 2010 may carry the Danfoss name.



1 Controller (ECU) 2 Suction line 3 Schrader valve

Type 2: Cascade (purple controller)

Cascade compressors were used in the SunDanzer DCF390 chest freezer. The DCF390 is no longer made, but hundreds are still in use. They are easy to spot: the controller is purple.



1 Controller (ECU) 2 Suction line 3 Schrader valve

Type 3: Other compressors

Over the years there have been small runs of SunDancer units with other compressors. They may look different, but they almost always work like a Secop. Troubleshoot them as a Secop compressor.

How to identify your controller (ECU)

Secop



The model number is printed on the front, with the voltage below it.

Secop controllers come in 12/24 V and AC/DC versions. An AC/DC controller can be connected to AC and 12/24 V DC at the same time; it uses AC power first.

[Buy a Secop controller](#)

Cascade



Cascade controllers are purple, and the voltage is not printed on the front.

SunDanzer usually shipped 12/24 V Cascade controllers; 48 V versions also exist.

For a Cascade controller, email info@sundanzer.com to check availability.

Replacing a Secop controller?

The new controller must match your compressor. Check the compatibility tables in [Appendix B](#), or email a photo of the compressor label to info@sundanzer.com and we will tell you which one to buy.

03 Troubleshooting steps

Step 1: Is the compressor running?

Put your hand on the compressor to feel whether it is running. Then follow the path that matches.

Path 1: The compressor is not running

An electrical problem.

- a. **Check the power supply first.** Most of the time there is a bad connection between the battery and the fridge, or the battery is not fully charged. See the low-voltage checks under [1 flash](#).
- b. **Test the thermostat** ([Test the thermostat](#)).
- c. Still not running? Go to [Step 2](#).

Path 2: It runs, but the temperature is wrong

The compressor runs all the time and the unit is not cold (it uses more power than usual), or it runs normally but the unit is not cold enough or is too cold.

- a. **Test the thermostat** ([Test the thermostat](#)).
- b. If the thermostat is fine, the unit may be low on refrigerant. See [Refrigerant problems](#).

Step 2: Read the fault light

Secop and Cascade controllers show a fault code on a small red LED inside the compressor compartment. The light flashes a number of times, pauses, then repeats. Count the flashes in one group.

If the fridge is not running and the light is not flashing, check that the LED is connected correctly. It goes to the **+** and **D/I** terminals on a Secop controller (see [Appendix A](#)).

No LED fitted? You can buy one from our [parts page](#), or use any 5 V LED with quick-connect terminals. You can also troubleshoot without one: go to [Step 3](#).



1 Red fault LED

Secop controllers

● 1 flash Low voltage

The controller measures voltage at its large + and – terminals, so the fridge itself is usually fine. It stops the compressor below **10.4 V** on a 12 V system or **22.8 V** on a 24 V system. A basic multimeter usually cannot catch the short voltage dip when the compressor tries to start, so a battery that reads OK can still be the cause.

HOW TO FIX IT

- Measure the voltage at the controller's large + and – terminals so you have an accurate starting point.
- Check every connection between the battery and the controller: crimps, connectors, plugs, fuses and breakers. Each one should feel solid and not wiggle.
- Measure the voltage at the battery and compare it with the controller. Any difference means a bad connection; even 0.1 V matters to the controller.
- Check the wire size: 12 AWG or thicker. 14 AWG only works for runs under 10 ft on a small fridge or freezer.

● ● 2 flashes Fan terminal overload

This code says the small + and **F** terminals are overloaded: something connected there draws too much power. Almost no SunDanzer household unit has anything connected to these terminals, so it usually means one of two things.

HOW TO FIX IT

- A short in the wiring. Check every connector on the controller and make sure connectors on different terminals have an air gap between them.
- It can also mean the same as 3 flashes. See [3 flashes](#).

● ● ● 3 flashes Compressor cannot start

The most common code. It usually starts as low voltage: the compressor tries to start too many times in a row, and the code changes from 1 flash to 3 flashes.

HOW TO FIX IT

- Do all the [1-flash checks](#) first.
- The controller has failed and must be replaced. This is rare, but it happens in dirty environments or when the controller is over 10 years old. See [Replace the controller](#).
- The system is overcharged with refrigerant and the compressor cannot overcome the pressure. This only happens if refrigerant was added incorrectly. It needs a refrigeration technician.
- The compressor is seized and must be replaced. We have never seen this on a SunDanzer unit, but it is possible. Contact us.

●●●●● 4 flashes Compressor cannot hold minimum speed

HOW TO FIX IT

- [Test the thermostat](#). If the problem continues, go to b.
- Contact SunDanzer technical support ([technical assistance form](#)).

●●●●● 5 flashes Electronics too hot

Make sure air can flow around the compressor and the vents are not blocked.

HOW TO FIX IT

- [Test the thermostat](#). If the problem continues, go to b.
- The controller has failed and must be replaced (rare; more likely in dirty environments or after 10 years). Buy the controller that matches your compressor. If you are not sure which one, email a photo of the compressor label to info@sundanzer.com.
- Contact SunDanzer technical support ([technical assistance form](#)).

Cascade controllers (purple)

Flashes	Meaning	What to do
1	Motor fault	Follow Secop 3 flashes .
2	Under voltage	Follow Secop 1 flash .
3	Over voltage	The supply voltage is too high. Lower it with a DC-DC converter or adjust the power supply.
4	Over temperature	Follow Secop 5 flashes.
5	Over current / power	Follow Secop 5 flashes.

Step 3: No fault light? Check in this order

Without an LED you work through the likely causes one by one.

- Thermostat.** [Test the thermostat](#).
- Low voltage.** The most common problem by far. The controller stops the compressor below 10.4 V (12 V systems) or 22.8 V (24 V systems), measured at its large + and – terminals. Make sure the batteries are fully charged. Then measure the voltage at the controller and at the battery: any difference means a bad connection, which adds resistance and drops the voltage. Use 12 AWG or thicker wire.
- Check the power system again.** We keep track: about 90% of the time the problem is low voltage.

- d. **Controller failure.** Controllers usually fail after 10 to 15 years, sometimes after about 5 in harsh conditions. Replace it with the controller that matches your compressor ([buy a controller](#)). Not sure which one? Email a photo of the compressor label to info@sundanzer.com.
- e. If none of this starts the compressor, contact SunDanzer technical support ([technical assistance form](#)).

04

Test the thermostat

Bypass the thermostat to see whether the compressor runs without it. This tells you whether the thermostat or the controller is the problem.

1. Take off the side or back cover so you can see the controller.
2. Join the two thermostat terminals on the controller with a short piece of wire. In a pinch, needle-nose pliers work.

Controller	Terminals to join
Secop	C and T
Cascade (purple)	SP and G

3. Wait up to a minute and feel whether the compressor starts.
4. Remove the wire and reconnect the thermostat when you are done.

What the result means

Compressor starts: the thermostat has failed. Replace it (next section). [Buy a thermostat](#)

Compressor still does not start: the thermostat is fine. Go back to the power checks and fault codes, or [replace the controller](#).



A jumper wire joining the C and T terminals on a Secop controller.

05 Replace the thermostat

TIME

10 to 15 minutes

TOOLS

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

PART

New thermostat
[Buy a thermostat](#)

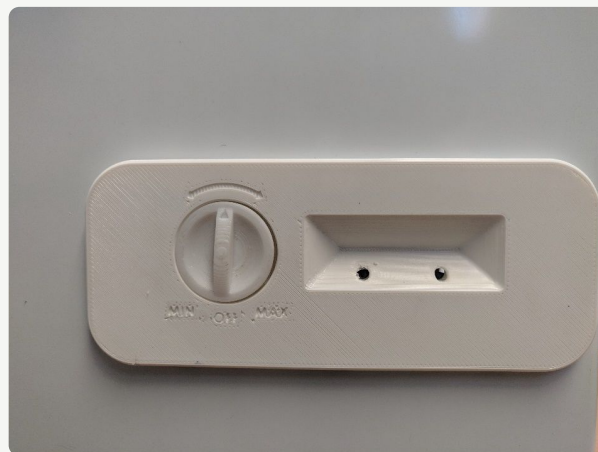


Which faceplate do you have?

The steps depend on the control panel on the front of your unit.

Style 1

[Go to Style 1 steps](#)

Style 2

[Go to Style 2 steps](#)

Before you start

Disconnect the unit from power before removing or connecting the thermostat wires.

Faceplate style 1

REMOVE THE OLD THERMOSTAT

- 1 Remove the side or back cover with a screwdriver.



- 2 Pull the thermostat sensor wire out from inside the fridge.



- 3 Take the knob off. Use a screwdriver to push it out from behind.



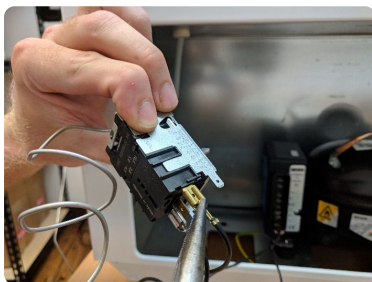
- 4 Remove the thermostat nut with a 14 mm or 9/16 in socket. Some sockets do not fit; use needle-nose pliers if needed.



- 5 Take the thermostat out from the inside of the fridge.

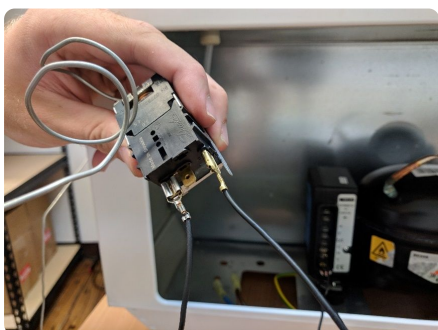


- 6 Remove the wires from the thermostat with needle-nose pliers. Grab the connector, not the wire.

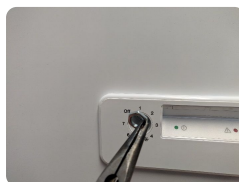
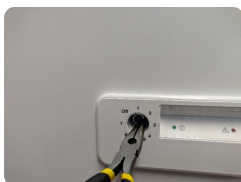


INSTALL THE NEW THERMOSTAT

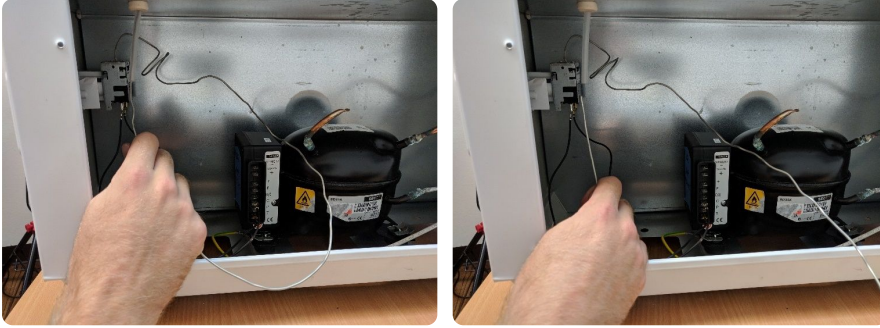
- 7 Connect the wires to the new thermostat the same way they came off. Wiring diagrams are in [Appendix A](#).



- 8 Install the thermostat with the 14 mm or 9/16 in socket (or needle-nose pliers). Make sure it is lined up correctly, and hold it while you tighten the nut.



- 9 Push the sensor wire back into the tube inside the fridge until it bottoms out.



- 10 Put the knob back on, reconnect power and check that the unit runs.



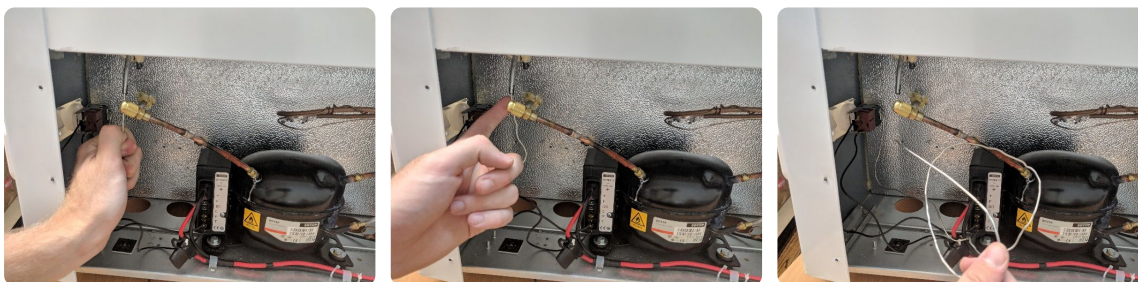
Faceplate style 2

REMOVE THE OLD THERMOSTAT

- 1 Remove the side or back cover with a screwdriver.



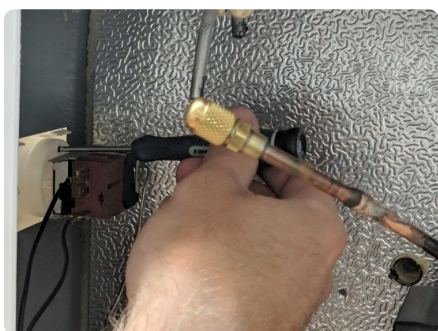
- 2 Pull the thermostat sensor wire out from inside the fridge.



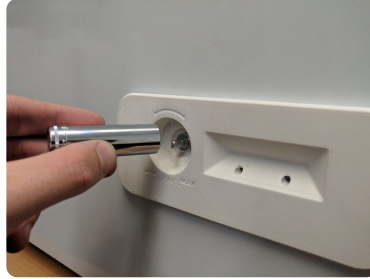
- 3 Pull the knob off.



- 4 If the knob is stuck, push it off from behind with a small screwdriver. There is a hole near the thermostat for this.



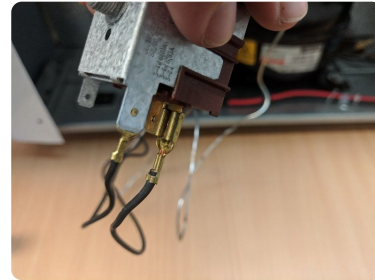
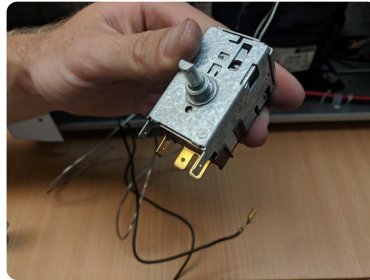
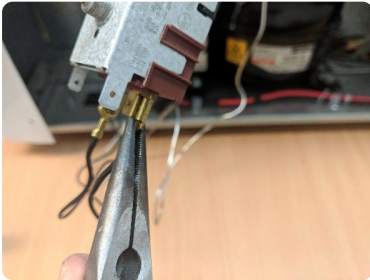
- 5 Unscrew the thermostat nut with a 14 mm or 9/16 in socket.



- 6 Take the thermostat out from the inside of the fridge.

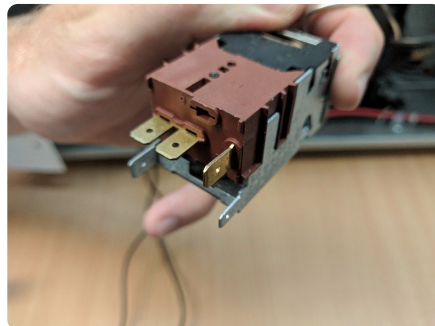
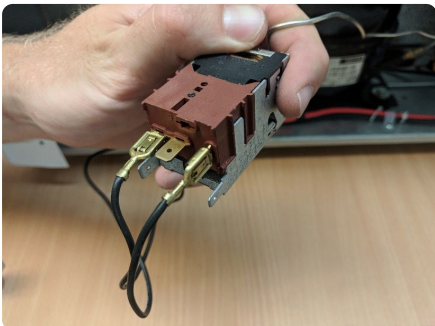


- 7 Remove the wires from the thermostat with needle-nose pliers. Grab the connector, not the wire.

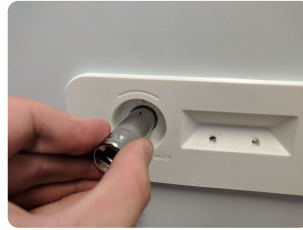


INSTALL THE NEW THERMOSTAT

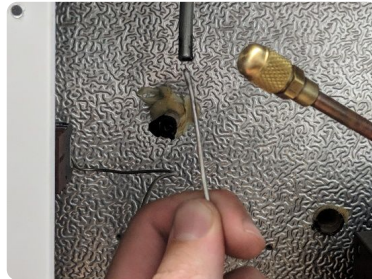
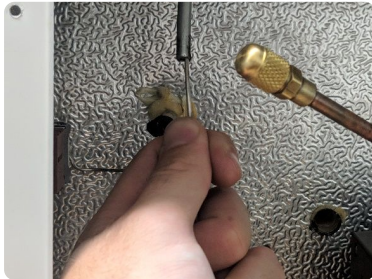
- 8 Connect the wires to the new thermostat the same way they came off. Wiring diagrams are in [Appendix A](#).



- 9 Install the thermostat with the 14 mm socket. Make sure it is lined up correctly, and hold it from the back while you tighten the nut.



- 10 Push the sensor wire back into the tube inside the fridge until it bottoms out.



- 11 Put the knob back on, reconnect power and check that the unit runs.



06

Replace the controller (ECU)

TIME

5 to 10 minutes

TOOLS

- Phillips-head screwdriver
- Needle-nose pliers

PART

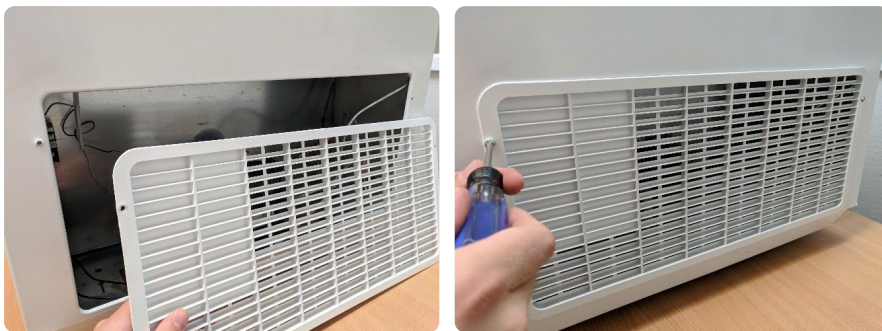
New controller that matches your compressor
[Buy a controller](#)

Get the right controller

Look at the old controller to see which type you have ([section 2](#)) and check [Appendix B](#). Not sure? Email a photo of the compressor label to info@sundanzer.com.

BEFORE YOU BEGIN

- 1 Remove the side or back cover.



- 2 Take a photo of the wiring so you can reconnect it the same way.

**REMOVE THE OLD CONTROLLER**

- 3 Disconnect the refrigerator or freezer from power.

- 4 Unplug the wires from the old controller.



- 5 Turn the controller screw clockwise. This lets you take the controller off without removing the screw.



- 6 Separate the controller from the compressor, screw side first.



- 7 Unplug the controller from the compressor. You may need a screwdriver to pry the plug loose.



- 8 Set the old controller aside.

INSTALL THE NEW CONTROLLER

- 9 Plug the new controller into the compressor, in the same orientation as the photos. **Make sure the plug is fully seated.**



- 10 Push the controller back onto the compressor. You may have to push hard.



- 11 Turn the controller screw counterclockwise to fasten the controller to the compressor.



- 12 Reconnect the wires exactly as in your photo. Wiring diagrams are in [Appendix A](#).



- 13 Reconnect power and check that the unit runs. If it still does not run, there is still an electrical problem: go back to the [power checks](#).

- 14 Put the side or back cover back on.

07

Refrigerant problems

If the compressor runs but the unit will not get cold, and the thermostat tests fine, the refrigerant charge may be low. A refrigerant problem must be fixed by a qualified refrigeration technician.

Do not add refrigerant yourself

Current SunDanzers models use hydrocarbon refrigerant (**R600a**, or **R290** in the DC400), which is flammable. Opening or charging the sealed system needs the right equipment and training. Adding the wrong refrigerant or too much of it can stop the compressor from starting (3-flash code). Older units may use R134a; those also need a technician.

Check the suction line

With the unit running, touch the suction line about 2 in from the compressor body ([section 2](#) shows where it is).

Suction line feels	What it means
Cool, like the inside of a fridge	The charge is about right. Test the thermostat and check the power.
Warm	Probably low on refrigerant.
Very cold, frosty or icy	Probably overcharged.



Find your refrigerant type

The refrigerant type is printed on the compressor label. The technician also needs the charge amount, which is on the label on the back of the unit.

Get it fixed

- If your unit is under warranty, contact us first: [technical assistance form](#) or info@sundancer.com.
- Otherwise, a local refrigeration technician can repair it using the labels above. Ask for someone who works with hydrocarbon (R600a / R290) refrigerants.

Once the unit runs normally, set the thermostat to the middle and check with a thermometer: the FDA recommends 40 °F (4 °C) in a refrigerator and 0 °F (–18 °C) in a freezer.



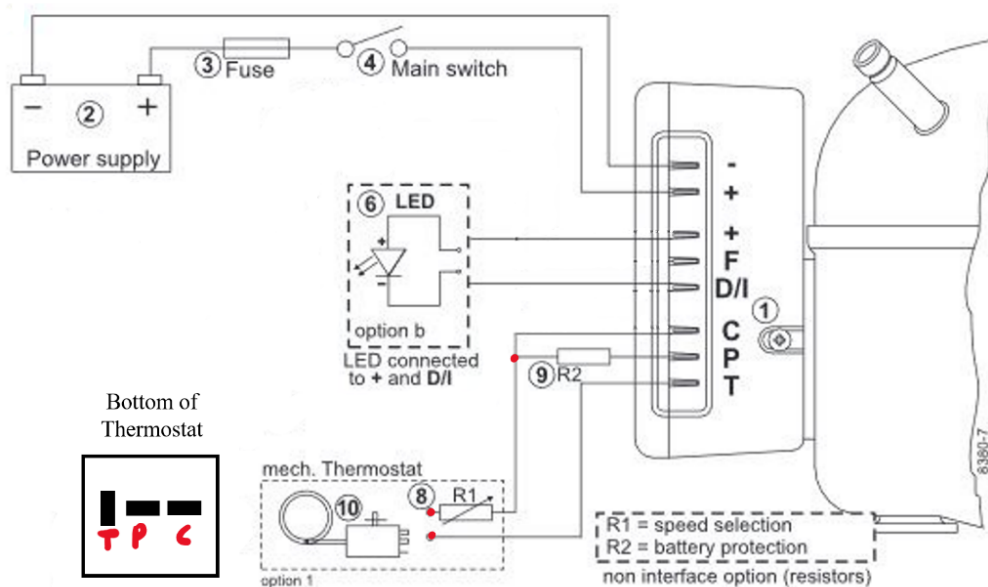
Still stuck?

Send us the [technical assistance form](#) or email info@sundanzer.com. Tell us your model, system voltage, the voltage at the battery and at the controller, and what the fault light is doing. A photo of the compressor label helps.

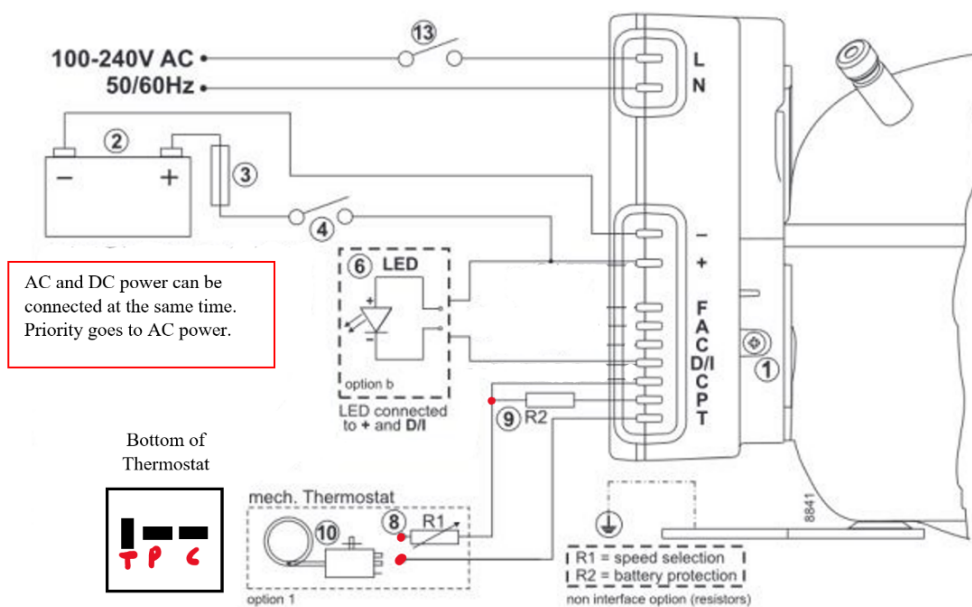
A Wiring diagrams

Use these when reconnecting a thermostat, controller or fault LED. Your own photo of the wiring is the best reference for your unit.

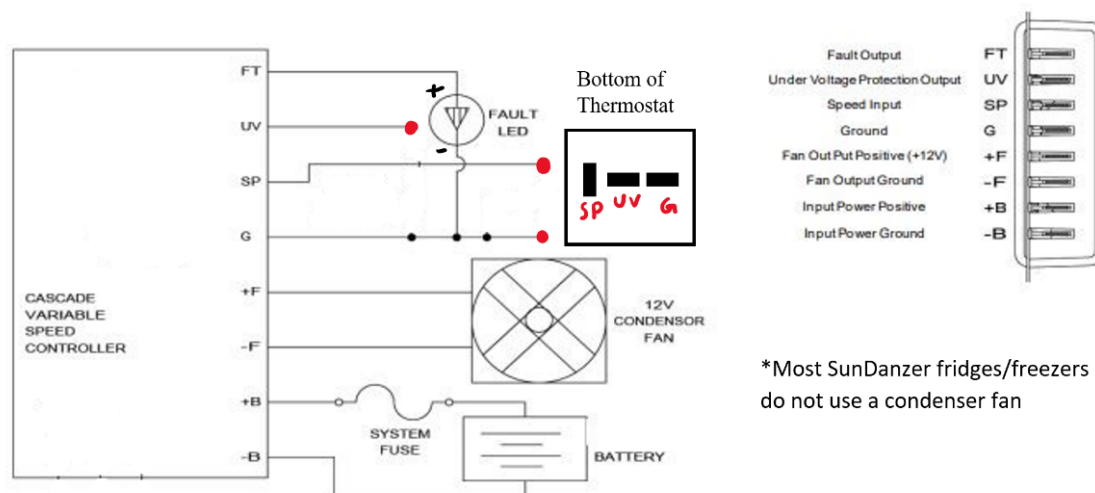
SECOP 101N0212 ECU



SECOP 101N0510 AC/DC ECU



Cascade 17 ECU



Cascade controller: the thermostat connects to SP and G. Most SunDanzer fridges and freezers do not use a condenser fan.

B Secop compressor and controller compatibility

Find your compressor in the left column and your controller across the top. If the box is **not shaded**, the compressor and controller work together.

Older controllers

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

Current controllers

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