5800 Refrigerator Compressor Capacitor/Relay Kit

Instruction Sheet

TELEDYNE ISCO
Everywhereyoulook™

60-4702-009
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Overview

The refrigerator compressor relay and capacitor are components of the Teledyne Isco 4700 and 5800 refriger-ated samplers. These instructions cover their removal and replacement in both models.

Section one of this instruction sheet describes how to access the refrigeration components. You must then determine which voltage rating and type of startup relay and capacitor you are replacing. Section two provides instructions appropriate for your refrigerator. Section three re-installs the refrigeration module, and section four tests operation following the installation.

Before attempting to remove and replace a module, observe the following precautions:

⚠⚠ WARNING

Removing a module exposes you to electrical and mechanical hazards. Always disconnect the AC power cord before attempting to remove any module. Only trained service personnel may remove or replace these modules.

⚠ CAUTION

Removing the sealed modules will expose the internal components. Wet or corrosive atmospheres may attack the exposed refrigerator components. Always service modules in a dry, corrosion-free environment.

⚠ CAUTION

Modules contain circuit boards and sensitive electronics that can be damaged by a discharge of static electricity. Avoid touching the internal components. Only handle the module by the edges or exterior surfaces.

⚠ CAUTION

Electrical connectors and wires can be damaged if improperly handled. Electrical connectors must only be handled by the connector body. Never grasp the wires or use tools to disconnect a connector. Never allow a module to hang by its wiring.

⚠ CAUTION

Earth ground bonding conductor. Do not remove or disconnect. If this conductor must be disconnected to remove a module, it must be reconnected when installing the replacement module.

Required Parts and Tools

- Replacement cap & relay kit:
  - 60-4707-002 for 115 VAC samplers, *or*
  - 60-4707-004 for 230 VAC samplers
  - Nylon cable tie 489-0110-00 (For best results, soak in water for one hour prior to use.)
- #2 & #3 Phillips screwdrivers
- 5/16" socket wrench
- 1/4" ratchet driver
- Wire cutters

1. Accessing the Refrigeration Components

1. Unplug the line cord to remove AC power.
2. Remove the parts according to the version of refrigerator you have (Figure 1).

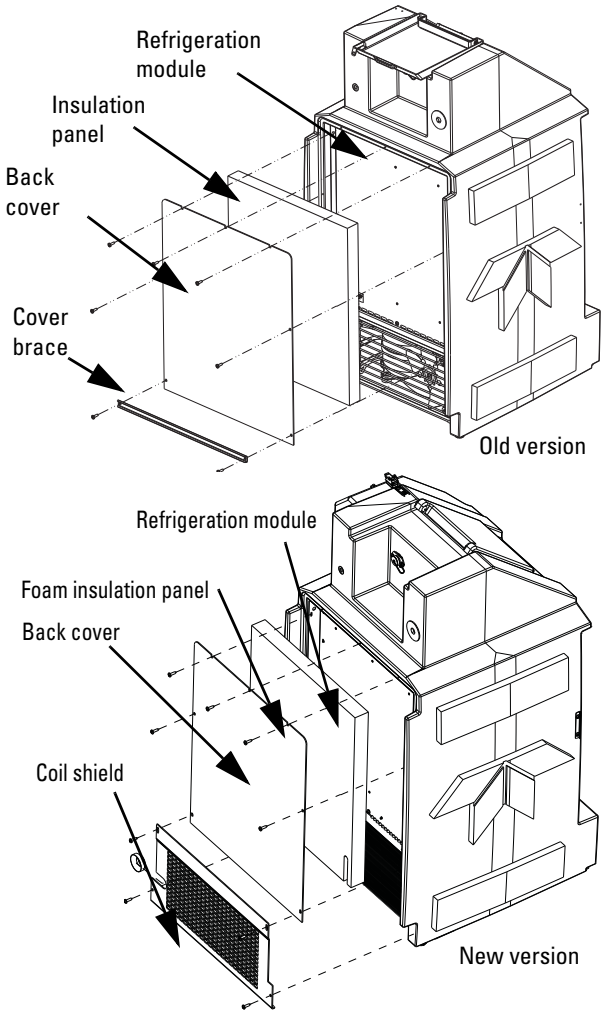


Figure 1: Remove back cover and insulation

3. Cut the cable tie holding the power cord that runs through the refrigeration assembly (Figure 2).

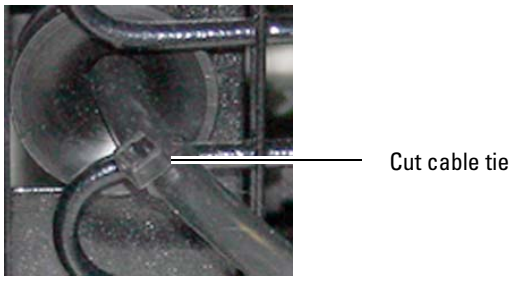


Figure 2: Cut cable tie to free line cord

4. Remove the refrigeration module mounting screws (Figure 3).
   Note that older refrigeration modules have an adhesive strip just above the rear coils. The bottom center screw may be slightly hidden by this strip.
5. Carefully pull the module out and rotate clockwise to expose the wiring connectors.
   The bushing holding the AC line cord in place should slide along the cord (see below). During reinstallation, the slack created in this step must be removed.

⚠ CAUTION

Keep the module as close to the refrigerator body as possible to avoid pulling the wiring taut and damaging the connectors.

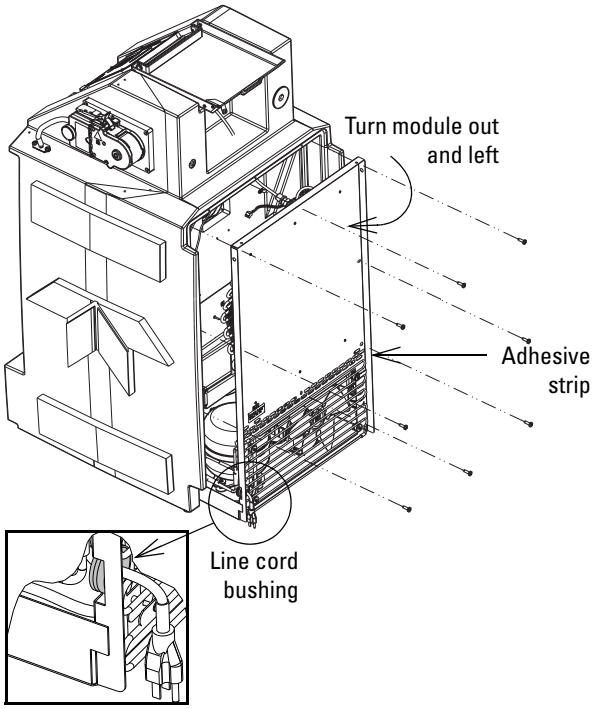


Figure 3: Removing the refrigeration module

6. Determine the operating voltage—115 or 230 VAC. This can be read from the serial num-ber label located inside the refrigerated bottle compartment. Proceed with instructions 2A for 115 VAC models, or 2B for 230 VAC models to replace the startup capacitor/relay assembly.

2A. 115 VAC Models - Replacing the One-piece Capacitor/Relay

1. Remove the cover from the compressor terminal box. If needed, use a screwdriver to release the locking tab.
2. Unplug the white connector with the orange and black wires from the bottom 2 pins on the compressor (Figure 6). On newer models this connector will be black and the wires will be orange and white. The orange wire always goes to the left.
3. Disconnect the blue wire from the capacitor/relay assembly from the blue wire from the power supply (Figure 6). On newer power supplies the power supply wire will be gray.
4. Disconnect the black wire from the capacitor/relay assembly from the ribbed black fan wire.On newer refrigerators the second black wire from the cap and relay assembly goes to the wrap around heater on the compressor. If the compressor has no heater then second black wire is not used. Tape the wire off and tuck away.
5. Remove the capacitor/relay assembly.
   A $^{5}/_{16}$-inch socket, short extension, and a $^{1}/_{4}$-inch ratchet driver are recommended to loosen the lock nuts. Once loose, lift the assembly to remove it (Figure 4).

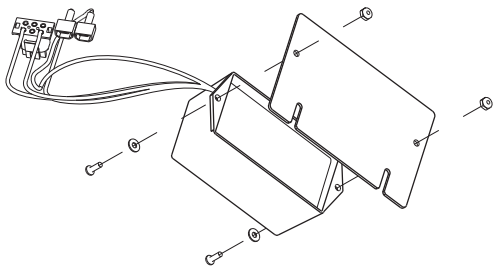


Figure 4: Attach the adapter plate

6. Mount the new assembly on the same posts which held the old assembly. Tighten the lock nuts with a 5/16-inch socket wrench to secure the new assembly (Figure 5).

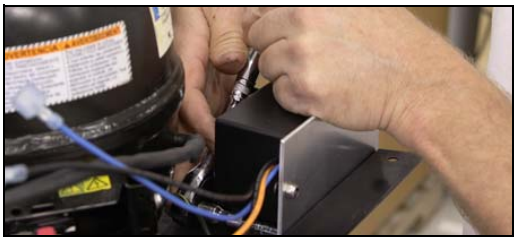


Figure 5: Mount the new assembly

Refer to Figure 6 for steps 7 through 9.

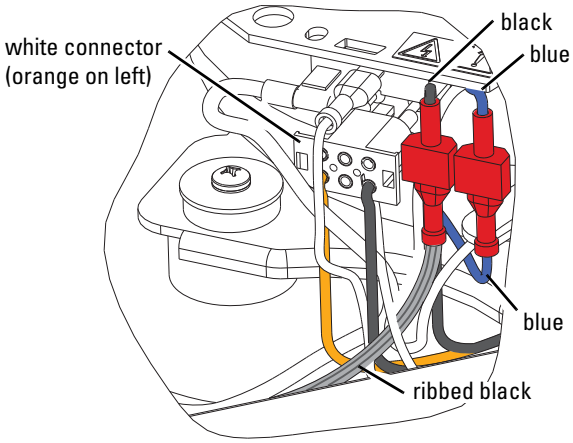


Figure 6: 115 VAC wiring connections

7. Plug the black connector from the new assembly onto the compressor pins below the terminals. Be sure the black connector is oriented so the orange wire is on the left side (Figure 6).
8. Connect the black wire from the capacitor/relay assembly to the ribbed black fan wire. On newer refrigerators the second black wire from the cap and relay assembly goes to the wrap around heater on the compressor. If the compressor has no heater then the second black wire is not used. Tape the wire off and tuck away.
9. Connect the blue wire from the capacitor/relay assembly to the blue wire from the power supply. On newer power supplies the power supply wire will be gray. (Figure 6)
10. Route all wire connections inside the compressor terminal box and replace the cover.

☑ *Note*

If you have a unit with serial number 216B or older, skip to section *3A. Module Replacement- Serial Number 216B and Older* using the instructions on page 4.

2B. 230 VAC Models - Replacing the One-piece Capacitor/Relay

1. Remove the cover from the compressor terminal box. If needed, use a screwdriver to release the locking tab.
2. Unplug the white connector with the orange and black wires from the bottom 2 pins on the compressor. On newer models this connector will be black and the wires will be orange and white; the orange always goes to the left (Figure 7).
3. Disconnect the blue wire from the capacitor/relay assembly from the blue wire from the power supply (Figure 7). The new power supply will have a gray wire.
4. Disconnect the black wire from the capacitor/relay assembly from the ribbed black fan wire. On newer refrigerators the second black wire from the cap and relay assembly goes to the wrap around heater on the compressor. If the compressor has no heater then second black wire is not used. Tape the wire off and tuck away.
5. At the right side of the compressor terminals, loosen the top and middle wire retainers, so that wires can easily be removed.
6. Remove the capacitor/relay assembly. A $^{5}/_{16}$-inch socket, short extension, and a $^{1}/_{4}$-inch ratchet driver are recommended to loosen the lock nuts. Once loose, lift the assembly to remove it (Figure 4).
7. Attach the metal adapter plate to the new capacitor/relay assembly using the #6 screws and lock nuts.

Refer to Figure 7 for steps 9 through 11.

8. Plug the black connector from the new assembly onto the compressor pins below the terminals. Note that the black connector must be oriented so that the orange wire is on the left side.
9. Connect the black wire from the capacitor/relay assembly to the ribbed black fan wire. On newer refrigerators the second black wire from the cap and relay assembly goes to the wrap around heater on the compressor. If the compressor has no heater then the second black wire is not used. Tape the wire off and tuck away.
10. Connect the blue wire from the capacitor/relay assembly to the blue wire from the power supply (Figure 7). On newer power supplies the blue wire from the power supply will be gray.
11. Route the wires, align and tighten the retainers (Figure 8).

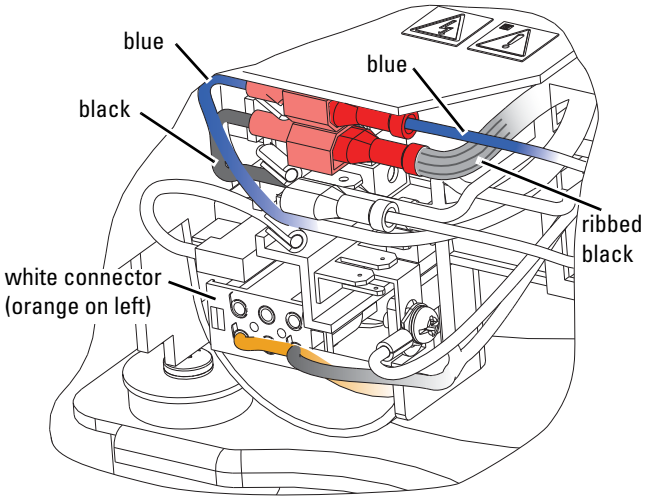
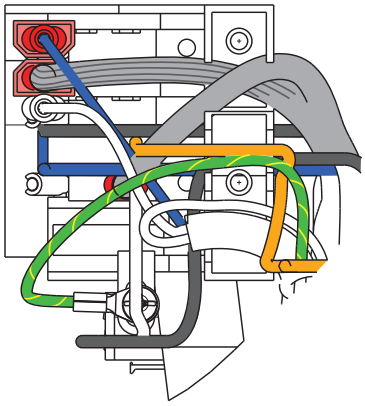


Figure 7: 230 VAC new wiring connections



Top Slot Wires:
- ribbed and smooth fan wires

Middle Slot Wires:
- single blue
- orange
- black (x2)
- single green/yellow

Figure 8: 230 VAC route and secure wires
(side view of compressor terminals)

12. Route all wire connections inside the compressor terminal box and replace the cover.

> ☑ ***Note***
>
> If you have a unit with serial number 216B or greater, skip to section *3B. Module Replacement-Serial Number 216B and Newer*.

3A. Module Replacement - Serial Number 216B and Older

The refrigeration module and rear compartment of the cabinet have adhesive strips and Permagum[1] (caulking cord sealant) protecting the components (Figures 9 and 10). **Ensure that all adhesive strips and Permagum are still in place before reassembly**. The adhesive strips and Permagum are required to prevent air flow between the condenser coil and the evaporator plate. Without this protection, water condensation on the coil will cause ice build-up, resulting in poor refrigerator performance.

> ☑ ***Note***
>
> Two thick, black cables connect the power supply with the AC and compressor (see Figure 9). **Ensure that these cables are side by side and not crossed during reassembly.**

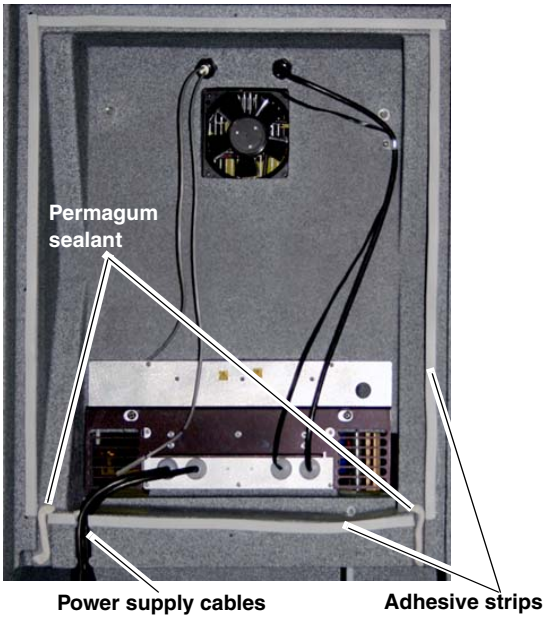


Figure 9: Rear view with module removed
(Adhesive strips, Permagum sealant, power cables)

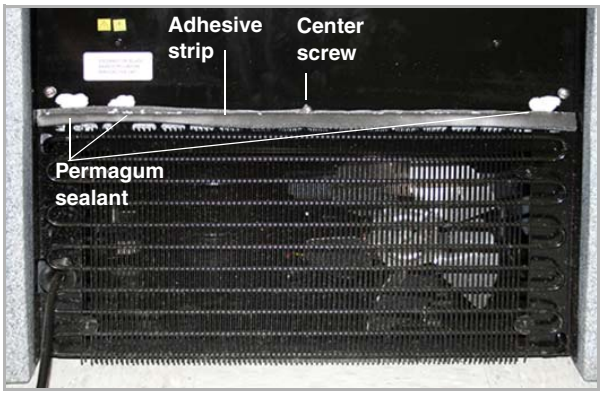


Figure 10: Rear view of refrigeration module
(Adhesive strip, Permagum sealant)

1. Move the refrigeration module up to the rear of the refrigerator and replace the drain tube in the drip pan on the module.

1. Permagum is a registered trademark of the Presstite Engineering Company.

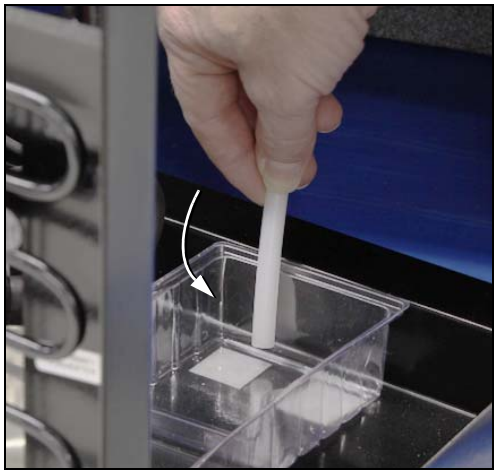


Figure 11: Position drain tube in front half of drip pan.

2. Reinstall the refrigeration module, tipping the top back while sliding the bottom forward. When the bottom is in place, push the top into place.

Figure 12: Slide refrigeration module into place

⚠ CAUTION

When reinstalling all self-tapping screws, avoid destroying the plastic threads. First seat each screw in its hole and, without pressing down, rotate the screw counter-clockwise until it falls into its thread groove with a "click." Then tighten the screw.

3. Reinstall the refrigeration module mounting screws (8), insulation panel/back cover screws (5), and cover brace screws (2).

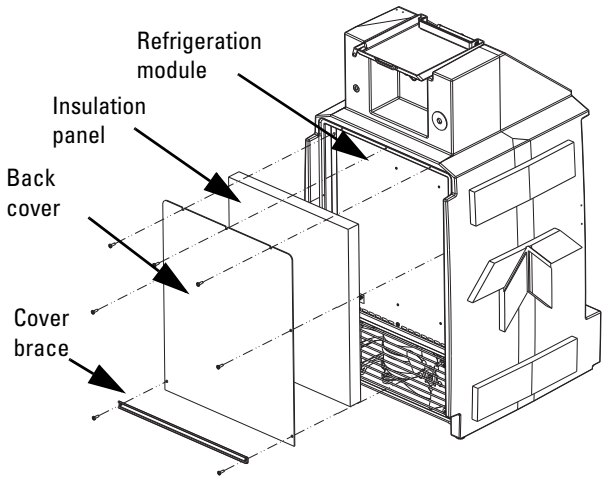


Figure 13: Old version

⚠ CAUTION

When installing/replacing the refrigeration unit, the line cord MUST be properly secured. This is to ensure that the cord cannot be pushed into the enclosure and be caught in the fan.

4. Hold the line cord taut to remove any slack, and attach a cable tie 489-0110-00, as shown below.

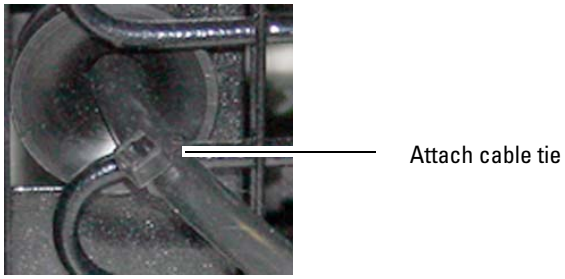


Figure 14: Attach cable tie to line cord

5. Restore AC power to the refrigerator.
6. After 45 minutes, perform the refrigerator temperature diagnostic test, as described in the section *4. Refrigerator Temperature Diagnostic* at the end of this document.

3B. Module Replacement-Serial Number 216B and Newer

Complete the following to reinstall the refrigerator module:

1. Ensure that the control wiring runs through the channel in the refrigerator body.

☑ *Note*

Two thick, black cables connect the power supply with the AC and compressor (Figure 15). **Ensure that cables are side by side and not crossed during reassembly.**

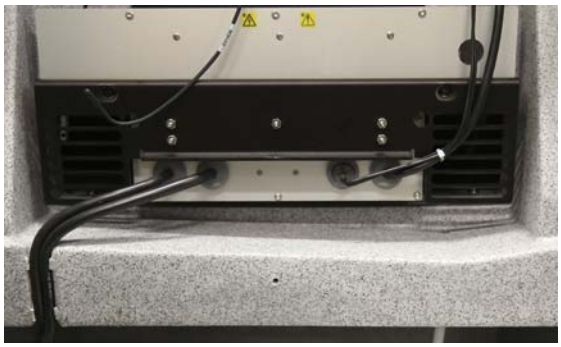


Figure 15: Rear view with the module removed

2. Slide the refrigeration module to the rear of the refrigerator and place the drain tube in the drip pan on the module (Figure 16).

Figure 16: Position drain tube in front half of the drip pan

3. Ensure the black gasket is aligned and gasket nubs are inserted in corresponding holes on the frame of the refrigerator module (Figure 17).

Figure 17: Position gasket on refrigeration module frame and ensure each gasket nub is inserted in corresponding hole

⚠ CAUTION

When reinstalling the refrigeration module, do not pinch the sensor wiring.

4. Install the module, tipping the top back while sliding the bottom forward. When the bottom of the system is in place, push the top into place (Figure). Ensure the slack in the power cord is removed before securing refrigeration module frame.

Figure 18: Slide module into place

⚠ CAUTION

When reinstalling all self-tapping screws, avoid destroying the plastic threads. First seat each screw in its hole and, without pressing down, rotate the screw counter-clockwise until it falls into its thread groove with a "click." Then tighten the screw.

5. Reinstall the coil shield, back cover, and insulation panel (Figure 19). When installing the foam insulation panel, take precautions not to damage the foam around the tubing (see inset Figure 19).

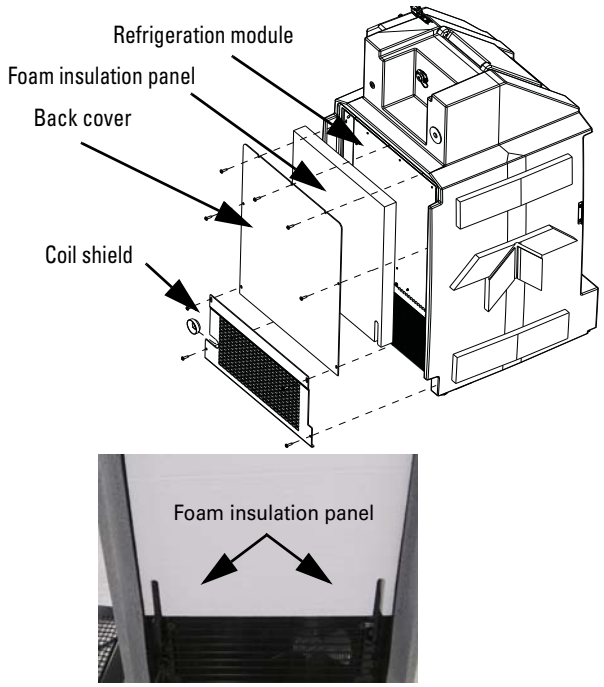


Figure 19: Back cover and insulation panel

6. Reinstall the refrigeration module mounting screws (8), insulation panel/back cover screws (5), and cover brace screws (2).

⚠ CAUTION

When installing/replacing the refrigeration unit, the line cord MUST be properly secured. This is to ensure that the cord cannot be pushed into the encloser and be caught in the fan.

7. Hold the line cord taut to remove any slack, attache the cable tie (489-0110-00) as shown in Figure 20).

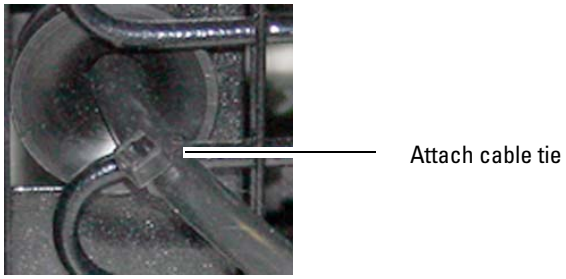


Figure 20: Attach cable tie to line cord

8. After 45 minutes, perform the refrigerator temperature diagnostic test, as described in the following section.

4. Refrigerator Temperature Diagnostic

The REFRIG TEMPERATURE diagnostic displays the temperature of the refrigerated compartment.

To start the diagnostics from the standby screen:

1. Select the CONFIGURE option and press ENTER.

```
PROGRAM   CONFIGURE
    VIEW LOG
```

2. Press the left arrow button until the RUN DIAGNOSTICS option is displayed. Press ENTER.

```
SELECT OPTION: (<-->)
  RUN DIAGNOSTICS
```

```
SELECT DIAG: (<-->)
   TEST 'RAM'
```

3. Press the right arrow key 7 times to display REFRIG TEMPERATURE. Press ENTER to start the test.

```
SELECT DIAG: (<-->)
 REFRIG TEMPERATURE
```

When this test is started, the sampler should display the temperature until you press the STOP or ENTER button. There is no pass or fail. This test simply provides continuous temperature monitoring.

```
REFRIG TEMPERATURE:
 AIR=__C EVAP=__C
```

As the refrigerator cycles off and on, the reported temperature will rise above and below the set temperature. However, the average reported temperature should be the same as the configured temperature. The evaporator temperature may at times read as low as –20° C; this is considered normal.

If the screen displays an asterisk (*) or inaccurate temperature reading, the temperature sensor cable may be malfunctioning.

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