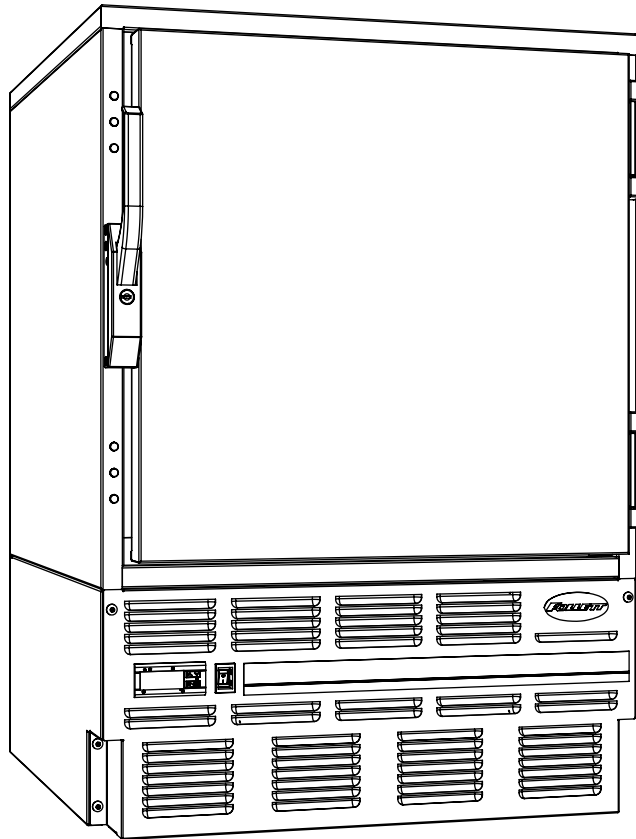


REF5-BB

Undercounter Blood Bank Refrigerator

Order parts online
www.follettice.com

Installation, Operation and Service Manual



**Following installation, please forward this manual
to the appropriate operations person.**

Welcome to Follett

Follett equipment enjoys a well-deserved reputation for excellent performance, long-term reliability and outstanding after-the-sale support. To ensure that this product delivers that same degree of service, we ask that you take a moment to review this manual before beginning the installation. Should you have any questions or require technical help at any point, please call our technical service group at (800) 523-9361 or (610) 252-7301.

Before you begin

After uncrating and removing all packing material, inspect the equipment for concealed shipping damage. If damage is found, notify the shipper immediately and contact Follett Corporation so that we can help in the filing of a claim, if necessary.

Specifications

REF5-BB

34.00" height for freestanding use or installation below standard 36" (915mm) high counter

2 drawer, 4.8 cu ft capacity – up to 50 (45ml) bags

Maximum drawer load - 35 lbs (16kg) each

Electrical specifications

115V, 60Hz, 1 phase

Full load amps: 8.0

Minimum circuit ampacity: 15 amp

Maximum size of branch circuit overcurrent device: 15 amp

Refrigeration specifications

Refrigerant – R404A

Charge size – 10 oz

Maximum design pressures:

High side – 422psi

Low side – 175psi

Installation specifications

Ambient temperature must not exceed 100°F (38°C).

The front louvered panel must be kept free of any cabinet trim or obstructions to ensure proper ventilation of the refrigeration system.



Important cautions

- Equipment must be wired according to local and NEC codes.
- Always disconnect power before servicing refrigerator.

Installation

Installing legs – required

1. Remove legs from plastic bag packed inside refrigerator.
2. Tip refrigerator back and screw legs in all the way to stop (they will extend 1/8" below base of refrigerator).
3. Adjust legs as needed to level refrigerator in both directions. To access legs, remove the lower front panel. Turn legs clockwise to extend legs.

Fig. 1

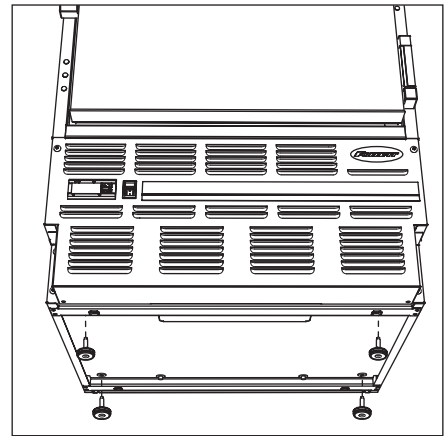


Chart recorder/alarm module

The chart recorder/alarm module (when ordered) is packed in the lower drawer. **Use the stainless steel, sheathed probe** included in the module package in conjunction with the product simulating bottle mounted inside the refrigerator.

Installing the probe

1. Punch hole in cap of product simulating bottle.
2. Fill bottle with glycerin or user-preferred liquid.
3. Reinstall bottle in bracket.
4. From refrigerator back, route probe through gasketed port (where refrigerant line enters) and hole in backwall evaporator cover.
5. Plug probe into back of recorder module and proceed with set up, following instructions included with chart recorder.

Reversing the door swing – optional

1. Remove screws and latch from refrigerator cabinet. (Fig. 3.1).
2. Use flat screwdriver to carefully remove (do not scratch) hinge covers (Fig. 4.1).
3. Support door and remove screws attaching hinge to refrigerator cabinet (Fig. 4.2).
4. Cover hinge screw holes with screw hole plugs removed from opposite side.
5. Reverse door and reinstall hinge screws.
6. Reinstall latch on opposite side.
7. Remove screws and handle from door (Fig. 5.1).
8. Rotate handle (Fig. 5.2).
9. Reinstall handle screws (application of 242 blue Loctite® to handle screws recommended).

Fig. 3

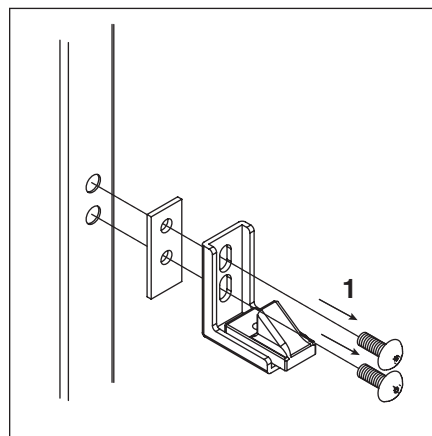


Fig. 4

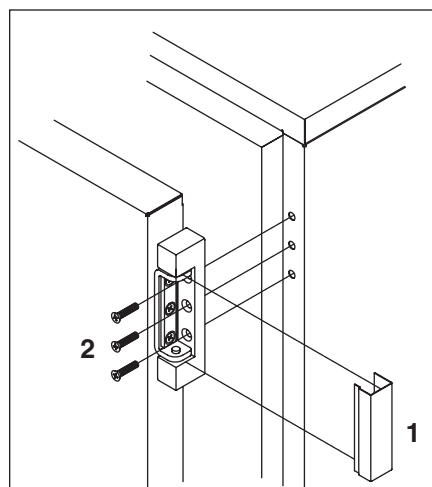
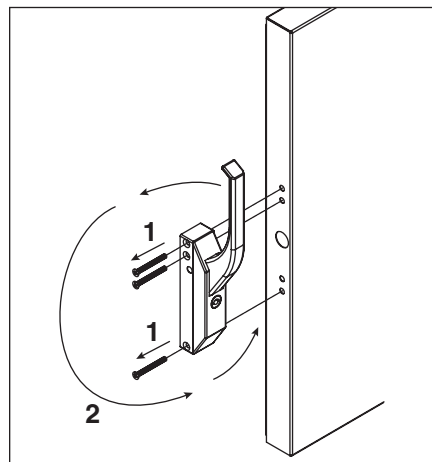


Fig. 5



Controller operation

In normal operation the controller displays cabinet temperatures in °C (default) or user-selected °F. °C temperatures are displayed to 1 decimal point.

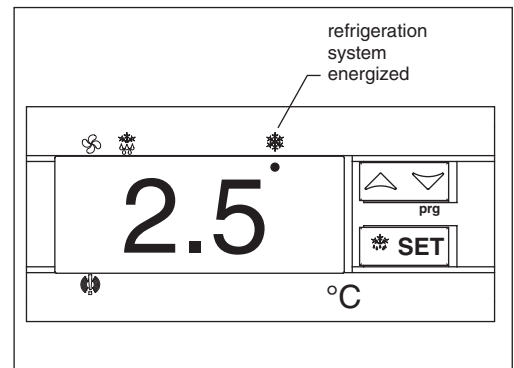
Rocker buttons to the right of the temperature display control all programming functions.

The controller is pre-programmed with a +3.5°C (+38°F) set point which provides a compressor cut-in at +3.5° (+38°F) and cut-out at +5.0°C (+41°F).

All set points have a 1.5°C differential. The 1.5°C differential means that with a +3.5°C set point, for example, the compressor will turn off at +3.5°C (+38°F) and turn on when the cabinet temperature reaches +5°C (+41°F).

This temperature may not reflect the temperature of the blood products in the refrigerator. The temperature of the blood products will be reflected on the recorder chart and the recorder's digital temperature display. At times there may be a difference between the two displayed temperatures. Adjust the controller SET value to achieve your desired blood product temperature as displayed on your chart recorder.

Fig. 6



To display temperature cut-out

STEP	INPUT	DISPLAY
1	Press and release SET	Current cut-out temperature will display for approximately 5 seconds. Display will return to current refrigerator temperature.

To change temperature cut-out

STEP	INPUT	DISPLAY
1	Press and hold SET for 3 seconds	Current cut-out temperature displayed, refrigeration system energized LED flashes
2	Press UP or DOWN arrows to desired cut-out temperature	New cut-out temperature displayed
3	Press and release SET	New cut-out temperature blinks three times, then current refrigerator temperature will display

Refer to the chart below for the set point for your application's required temperature range.

SET POINT °C	CUT-IN °C	CUT-OUT °C	NORMAL DISPLAY RANGE °C
+3.5°C	+5.0°C	+3.5°C	1.5° to 5.0°

Controller security

The controller panel can be locked to prevent inadvertent or intentional programming changes. In locked mode, the controller will display cabinet temperature and cut-out set point only.

To lock the controller

1. Press the UP/DOWN ARROW in the middle until “POF” displays.
2. Programmer is now locked.

To unlock the controller

1. Press UP/DOWN ARROW in middle until “PON” displays.
2. Programmer is now unlocked.

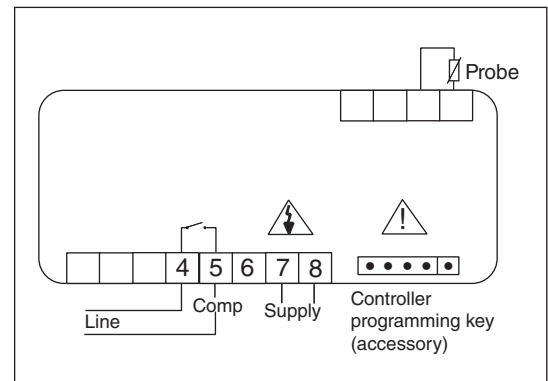
Controller programmer key (optional accessory)

A controller programming key is available from Follett to provide fast and easy re-programming of factory settings. Programming key part number is 00161950.

Programming refrigerator from the programming key (download)

1. Turn OFF refrigerator.
2. Remove 6 screws from front panel to access back of controller.
3. Insert appropriate programmed key into 5 PIN receptacle on controller back.
4. TURN ON refrigerator.
5. Values from key automatically download to refrigerator (“dol” message blinks followed by “end”).
6. After 10 seconds display returns to current refrigerator temperature and controller will restart with new values.
7. Remove key.

Fig. 7



Note: An “Err” message displays for failed programming. Turn refrigerator OFF then ON to restart download, or remove key to abort.

Operation

The temperature controller and probe indicate when the refrigeration system is required to turn on and off.

The refrigeration system removes heat from the cabinet interior and rejects it to the surrounding room air. When the cabinet interior temperature reaches +1.5°C above the controller set point, the probe signals the controller to turn the refrigeration system on. The normally open controller contacts close and energize the condenser fan motor and compressor. The compressor uses a current-style starting relay and a starting capacitor to start the compressor motor.

When the cabinet interior temperature falls to the set point, the probe signals the controller to turn the refrigeration system off. The controller contacts reopen, which de-energizes the condenser fan motors and the compressor. The evaporator fan motor runs continuously.

Any accumulated frost on the evaporator coils melts during the off cycle. The condensate drains to a drain pan mounted alongside the condensing unit. The heat from the condensing unit evaporates any condensate in the drain pan.

Temperature control

The temperature control system is preset by the factory to maintain a cabinet temperature of +3.5°C to +5°C (+38°F to +41°F). If desired, the cut-out temperature can be raised as high as +6°C by following the instructions on page 5 for changing the temperature set point. The +1.5°C cut-out differential will be maintained regardless of the controller set point.

Defrosting

REF5-BB Series undercounter refrigerators do not require manual defrosting. The unit cooler defrosts automatically when the condensing unit is in the OFF cycle.

Cleaning



Use only non-chlorine-based cleaners. Cleaners containing chlorine can cause staining and pitting of the stainless steel.

Interior – Using a sponge or soft cloth, clean unit with a non-abrasive, non-chlorinated, all-purpose detergent.

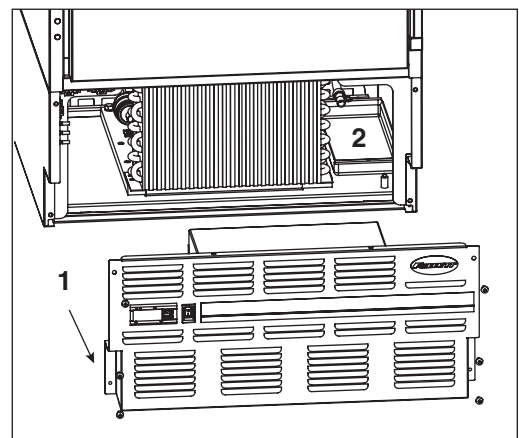
Exterior – Wipe exterior with a soft cloth in the direction of grain as needed. Stainless steel polish may be used to enhance the finish of the unit.

Annual cleaning

Removal of dust and other particulates from air intake areas and the condenser is important for proper operation. Some environments with large amounts of dust may require more frequent cleaning.

1. Disconnect power to unit by turning switch on the lower front panel to the OFF position, switching circuit breaker to OFF position, and removing power cord from receptacle.
2. Remove lower front panel (Fig. 8.1).
Note: Front louvered panel may be removed for more frequent cleaning of the condenser as needed
3. Remove drain pan (Fig. 8.2).
4. Clean drain pan with a non-abrasive, non-chlorinated all-purpose detergent.
5. Reinstall drain pan.
6. Use a vacuum cleaner with brush attachment to clean condenser through lower front panel and compressor motor and related parts through lower rear panel.
7. Reinstall lower front panel.

Fig. 8



Service

Latch adjustment

To adjust for proper latch engagement

1. Loosen striker plate mounting screws (Fig. 8.1).
2. Move striker plate up or down as required and tighten screws.
3. Test operation of latch.

To adjust for proper gasket seal

1. Loosen striker depth adjustment screw (Fig. 9.2).
2. Adjust stop in or out and tighten screws.
3. Test operation of latch.

Door gasket replacement

1. Remove existing gasket from mounting track.
2. Verify mounting track is free of any remaining gasket material.
3. Align new gasket with mounting track and press firmly in place.
4. Open and close door, checking for proper gasket seal without pinching against refrigerator.
5. Adjust latch and or striker as necessary for proper door closure.

Slide-out compressor tray

Follett's slide-out compressor tray allows technicians to partially slide the condensing unit from the refrigerator back without cutting refrigerant lines.

1. Remove rear panel (Fig. 10.1).
2. Remove two bolts securing condensing unit to refrigerator base (Fig. 10.2).
3. Gently slide condensing unit out (Fig. 10.3).

Note: Do not put undue strain on the refrigerant lines.

Removing drawers

1. Pull drawer forward to stop.
2. Lift drawer front to free front rollers from sides.
3. Still lifted, pull drawer forward to free back rollers from sides.

Removing slides

1. Push slides all the way back.
2. Lift bottom of slide up and away from rollers.

Fig. 9

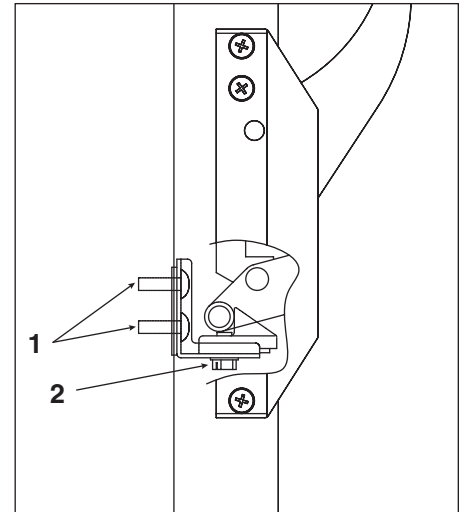
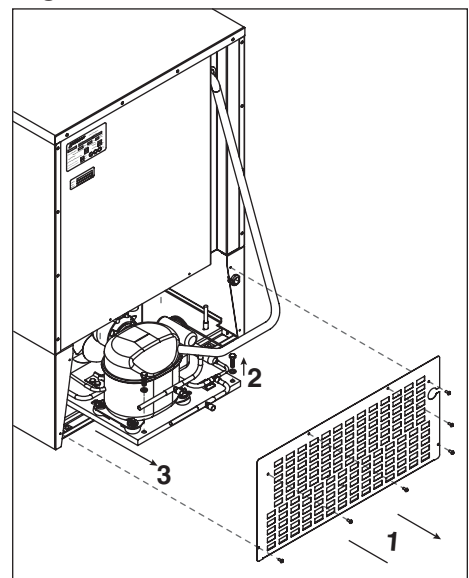


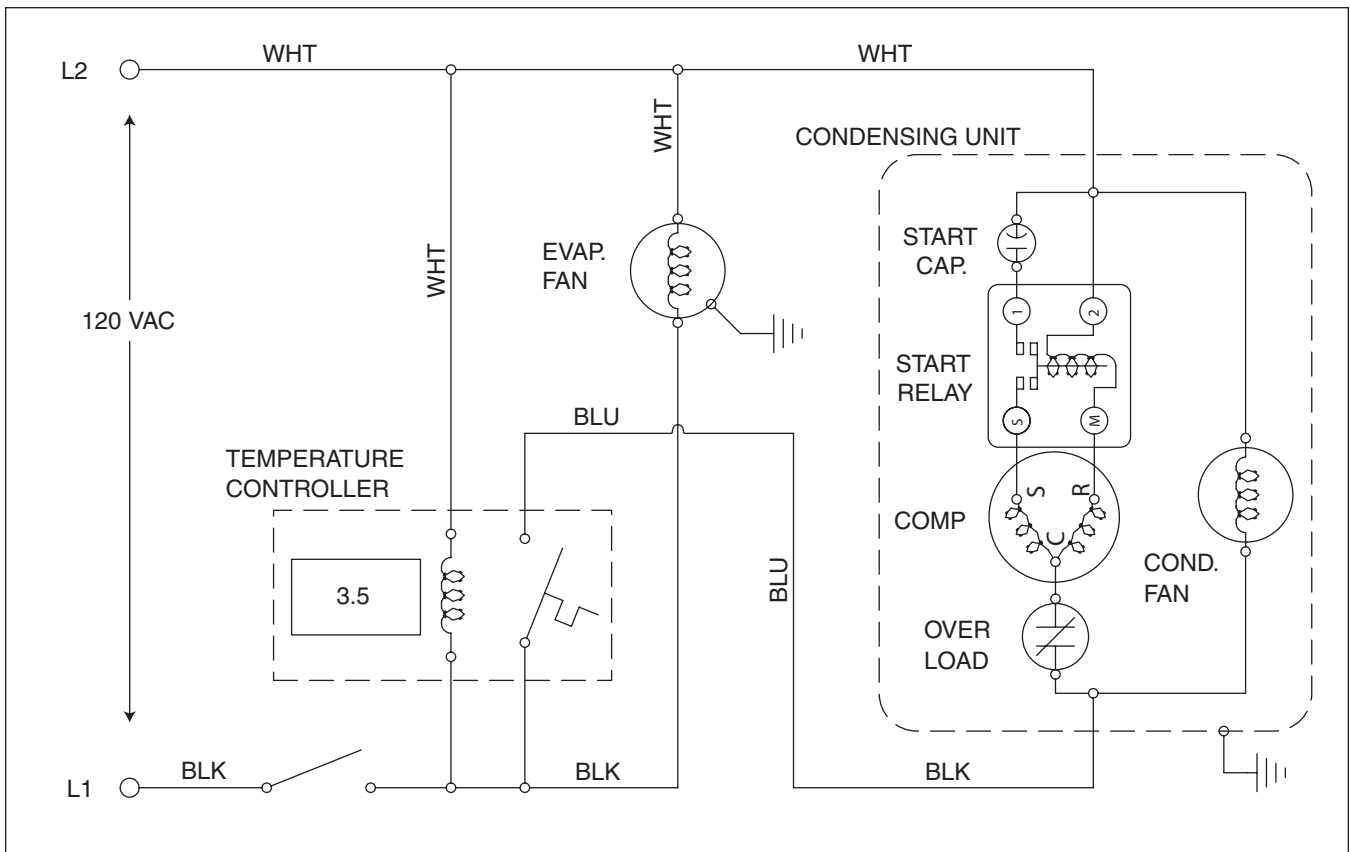
Fig. 10



Controller replacement

1. Disconnect power to unit
 - a. Push front panel rocker switch to OFF position.
 - b. Disconnect power cord.
2. Remove 6 screws from front panel and slide panel forward to access back of controller.
3. Disconnect front panel and wiring harness from refrigerator at the 3, and 4 pin connectors to simplify replacement.
4. Push in on center of side brackets (on controller) to release and slide brackets back and off controller.
5. Push controller and wires out through front of front panel.
6. Using wiring schematic (attached to front panel and below) as a guide, remove wires one at a time from back of existing controller and connect to corresponding terminals on replacement controller.
7. Gently remove faceplate from existing controller and install on replacement controller.
8. Insert replacement controller back through front of panel.
9. Slide brackets onto sides of controller and push against back of front panel.
10. Reconnect 3 and 4 pin connectors of wiring harness to refrigerator.
11. Keeping wiring clear of condenser, replace front panel.
12. Restore power and test operation. Reprogram replacement controller if necessary.

Wiring diagram



Refrigeration system

The REF5-BB series refrigeration system is designed to give many years of trouble-free service. Except for routine cleaning of the air-cooled condenser and related parts, the refrigeration system requires no service or maintenance. The system uses a thermostatic expansion valve and is critically charged. Access fittings are provided for ease of service. However, the connection of refrigeration service hoses to the fittings will almost invariably result in a significant change in the system charge. This change can adversely affect the performance of your refrigerator. Therefore, Follett recommends that if hoses are ever connected to the refrigeration system for service, the refrigerant should be recovered, the system evacuated, and recharged by weighing in the correct refrigerant charge.

Note: Do not charge the system by pressures.

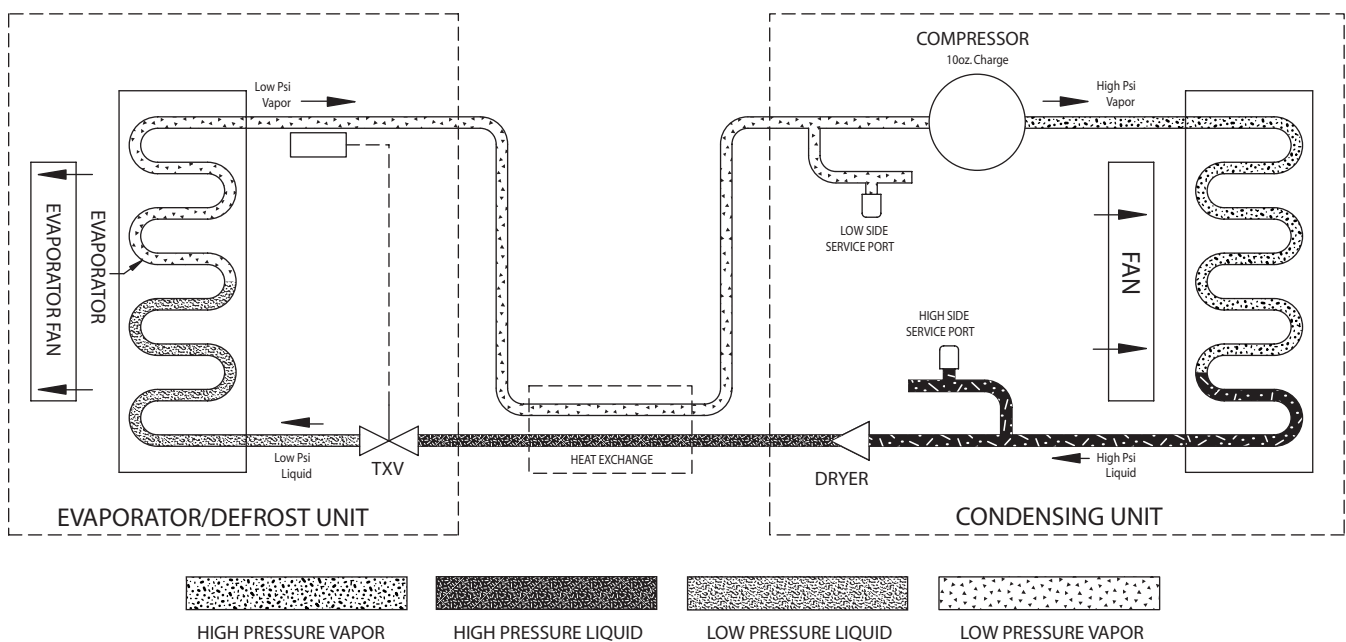
Checking refrigeration system pressures

1. Remove the rear access panel (Fig. 10).
2. Turn the power switch to the on position.
3. Following the instructions on page 5 verify that the temperature controller is set to the original factory set point (cut-out) setting of +3.5°C (+38°F).
4. Allow the freezer to operate and stabilize at least 30 minutes, verifying the cut-out temperature is being reached.
5. Connect refrigerant hoses to access fittings and measure air temperature at condenser intake grille.
6. Verify correct pressures with the temperature chart below.
7. Troubleshoot refrigeration system as needed.

Note: Do not attempt to obtain correct refrigeration pressures by adjusting the system charge.

Condenser inlet air temperature	70° – 100°F
Discharge pressure (psi)	190 – 210
Suction pressure (psi)	40 – 50

Refrigeration system diagram



Blood bank refrigerator troubleshooting guide

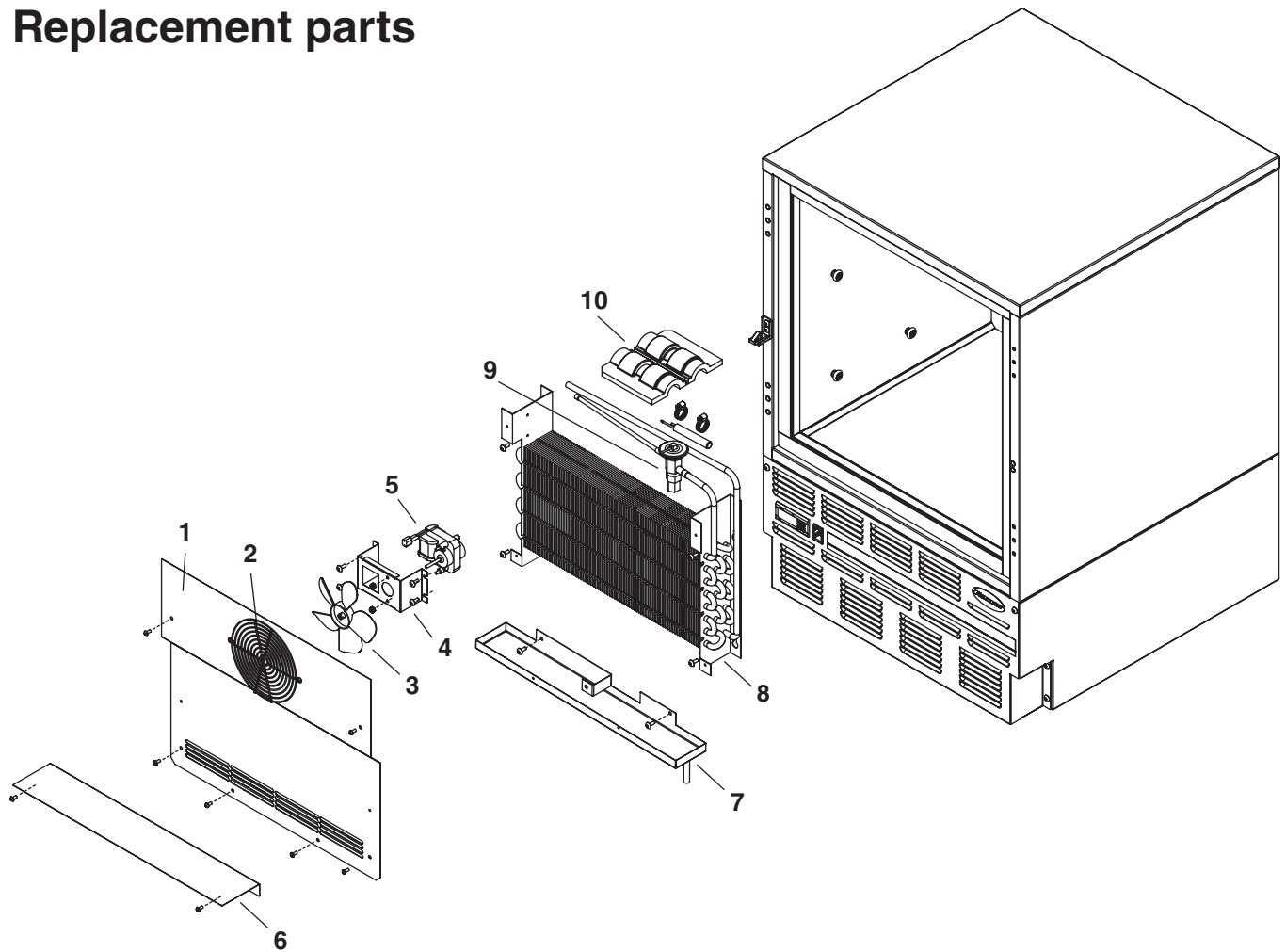
Before calling for service

1. Check that unit is plugged in.
2. Test outlet with another appliance to verify power.

Symptom	Possible cause	Solution
Refrigerator does not operate (no components run).	<ol style="list-style-type: none"> 1. Power switch faulty or in OFF position; loose connection. 2. Refrigerator not plugged in. 3. No power to cord. 4. Temp controller not energizing components. 5. Probe not sensing cut in temperature. 	<ol style="list-style-type: none"> 1. Turn power switch to ON position; check switch and connections. 2. Connect plug. 3. Restore power. 4. Check controller contact terminals for power. Replace controller if needed. 5. Replace controller and/or probe.
Compressor does not run.	<ol style="list-style-type: none"> 1. Thermal overload open or defective. 2. Capacitor and/or relay defective. 3. Compressor defective. 	<ol style="list-style-type: none"> 1. Allow to cool or replace. 2. Replace as required. 3. Replace compressor.
Evaporator fan motor does not run.	<ol style="list-style-type: none"> 1. Defective fan motor. 	<ol style="list-style-type: none"> 1. Replace fan motor.
Refrigerator does not shut off.	<ol style="list-style-type: none"> 1. Controller not sensing cut off temperature. 2. Controller keeping refrigeration system energized. 	<ol style="list-style-type: none"> 1. Replace controller and/or probe. 2. Replace controller.
Refrigerator does not maintain temperature (all components run).	<ol style="list-style-type: none"> 1. Condenser or evaporator coil needs cleaning. 2. Faulty door gasket or hinges/latch loose 3. Excessively high ambient. 4. Refrigerant leak. 5. Incorrect refrigerant charge. 6. Plugged or defective expansion valve. 7. Inefficient compressor. 	<ol style="list-style-type: none"> 1. Clean coils as needed. 2. Replace door gasket. 3. Maximum recommended ambient is 100 degrees F. 4. Locate and repair leak. 5. Recover, evacuate and weigh in correct charge. 6. Replace expansion valve. 7. Consult technical service.

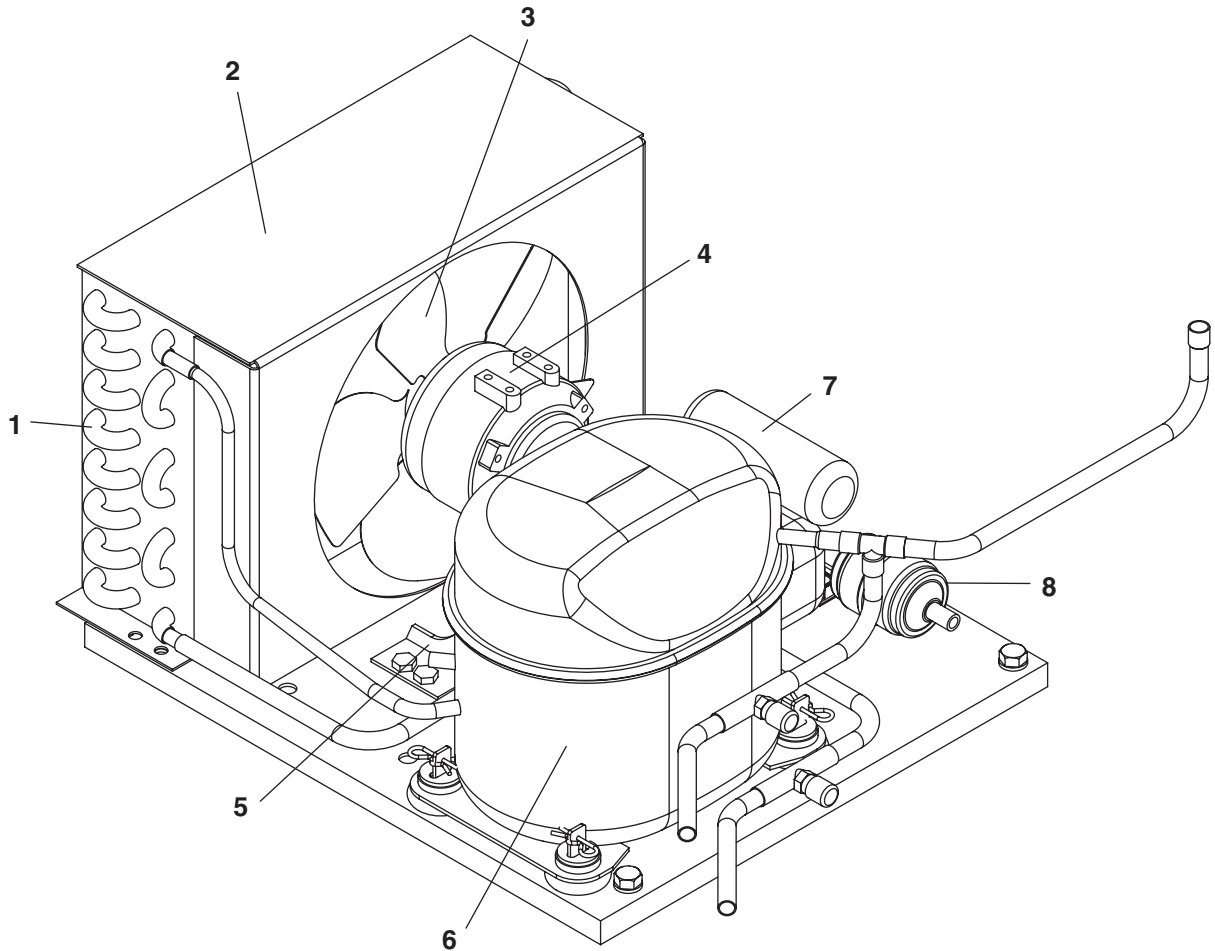
If problems persist after following this basic troubleshooting guide, call Follett's technical service group at (800) 523-9361 or (610) 252-7301.

Replacement parts



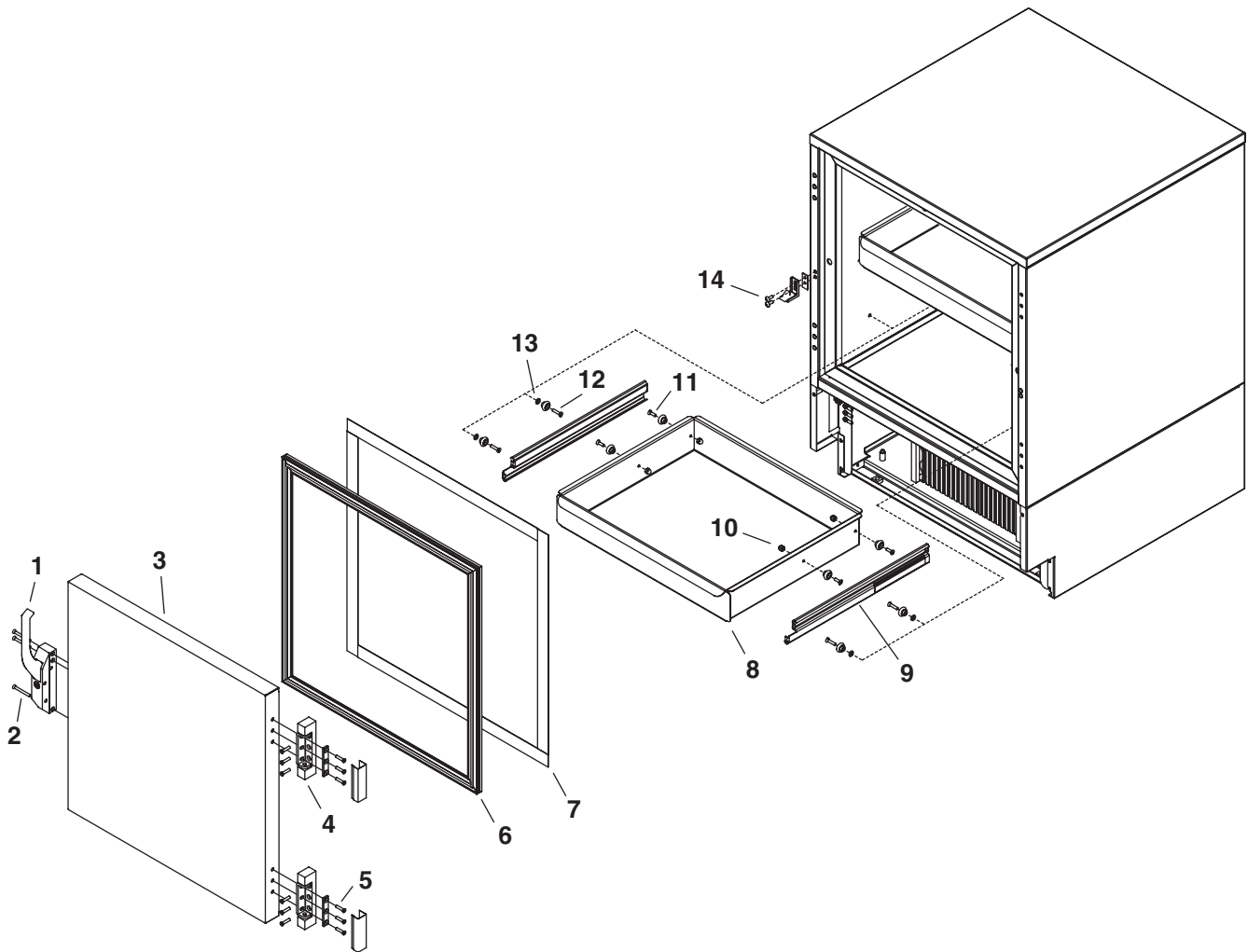
Evaporator

Reference #	Description	Part #
1	Cover, evaporator, (includes 00152892)	00155564
2	Fan guard	00152892
3	Fan blade	00152991
4	Bracket, fan motor	00152983
5	Fan motor, evaporator	00104919
6	Air baffle	00165126
7	Drain pan, evaporator	00162511
8	Evaporator	00151563
9	Expansion valve (includes 00106534)	00165118
10	Insulation, bulb	00106534



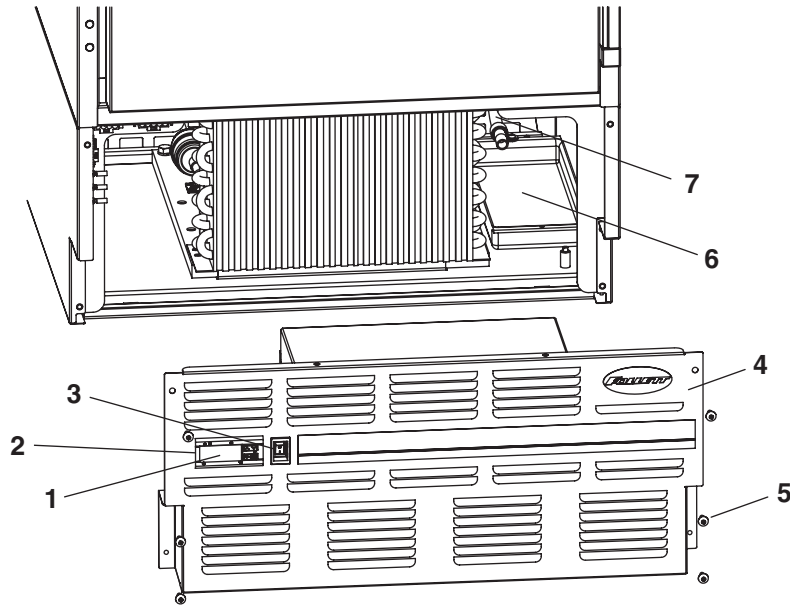
Condensing Unit

Reference #	Description	Part #
	Condensing unit	00105106
1	Condenser	00105619
2	Shroud, condenser	00157347
3	Condenser fan blade	00105007
4	Condenser fan motor	00104992
5	Fan motor bracket	00157412
6	Compressor	00104950
7	Starting capacitor	00104968
8	Filter drier	502724
Not shown	Cap, starting capacitor	00105627
Not shown	Starting relay	00104976
Not shown	Overload protector	00104984



Hardware

Reference #	Description	Part #
1	Latch & striker includes screws	00105023
2	Latch screws, 3 per latch	00103507
3	Door, REF5-BB (includes gasket - 21 3/8" x 21 3/8")	00105015
4	Hinge, each - 2 required, includes screws	00105031
5	Hinge screws, each - 6 per hinge	00105080
6	Gasket, REF5-BB	00125732
7	Strip sealer (set of 4) REF5-BB	00130138
8	Drawer	00165134
9	Drawer slides	Reference only
10	Nut, acorn, each (4 required per drawer)	00161802
11	Screw, 5/8", each (4 required per drawer)	200093
12	Screw, 7/8", each (4 required per drawer)	00161794
13	Washer, each (4 required per drawer)	00161786
Kit	Drawer & slide mounting hardware kit (includes 8, 9 and 4 each of 10, 11, 12 & 13)	00165142
14	Striker screws, each - 2 per striker	502287
Not shown	Bracket, alarm bottle	00161463



Hardware & electrical components

Reference #	Description	Part #
1	Temperature controller	00161570
2	Faceplate, °C	00157644
Not shown	Probe & harness, controller	00165167
3	Power switch	00114371
4	Front panel (includes 00114371 and 00105379)	00165159
5	Front panel screws, each - 6 per panel	00105379
Not shown	Rear panel, includes screws	00130161
Not shown	Rear panel screws, each - 6 per panel	00105387
6	Evaporator drain pan, includes clamp	00155614
7	Evaporator drain line, sold by the foot	203627
Not shown	REF5-BB programming key, °C	00161950
Not shown	Power cord	00103903

Chart recorder related items

Reference #	Description	Part #
Not shown	Gasket, bottle	00112029
Not shown	Bracket, bottle	00161463
Not shown	Bottle	00112037
Not shown	Battery	00112177
Not shown	6" replacement, 7 day charts (quantity of 60)	00162099
Not shown	Replacement pens (quantity of 6)	00162081
Not shown	Probe, chart recorder	00162073

