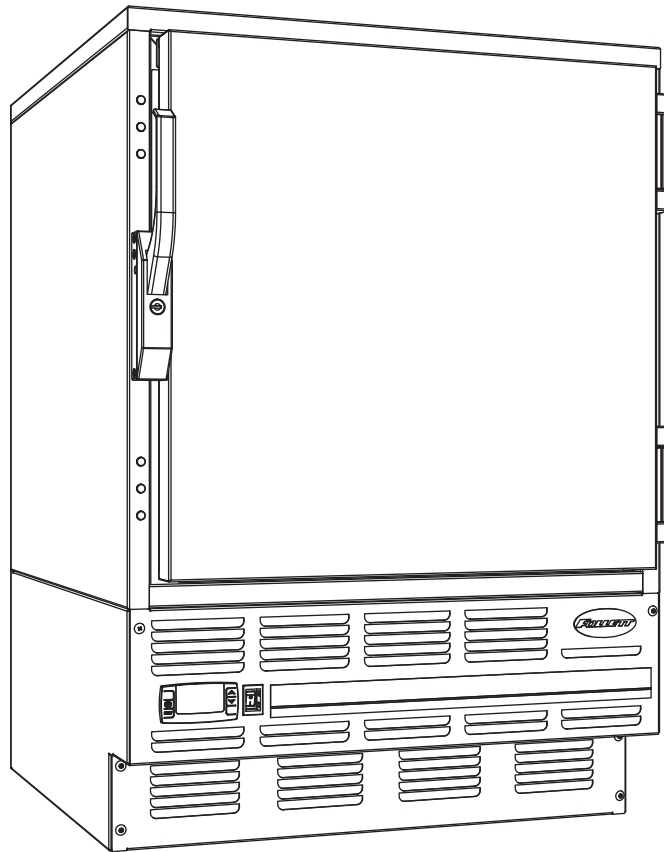


REF Series Undercounter Refrigerator

Order parts online
www.follettice.com

Installation, Operation and Service Manual

Serial numbers C45184 and above



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



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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

Series specifications

REF4-ADA	31.25" height	fits below 34" high ADA-compatible counter	4.0 cu ft capacity
REF5	34.00" height	fits below standard 36" high counter	4.8 cu ft capacity

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 – 8 oz

Maximum design pressures:

High side – 375psi

Low side – 174psi

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

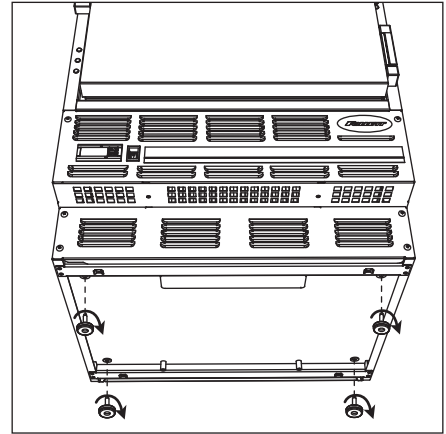
- Equipment must be wired according to local and NEC codes.
- Always disconnect power before servicing refrigerator.

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 REF).
3. Adjust legs as needed to level REF in both directions. To access legs, remove the lower front panel. Turn legs clockwise to extend legs.

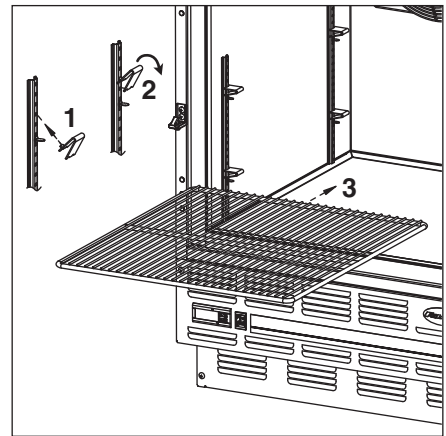
Fig. 1



Installing shelves – required

1. Remove shelves and shelf brackets packed inside refrigerator. (If ordered, find cut-out upper shelf accessory in separate box.)
2. Install shelf brackets in pilasters (insert top tab, squeeze and push in lower tab).
3. If ordered, position cut-out upper shelf accessory below evaporator with cut-out around drain.

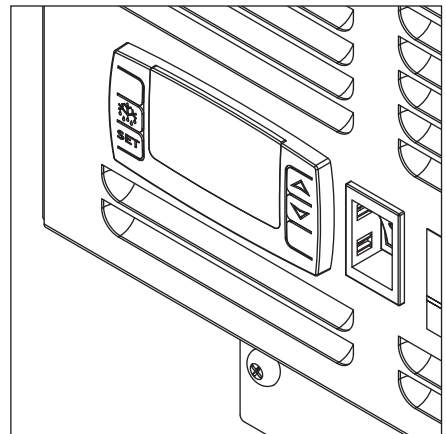
Fig. 2



Changing temperature controller settings – optional

Follett's temperature controller is pre-programmed with a 34 F set point and °F display. The 34° set point delivers a temperature range of 34 F – 38 F that may not meet the needs of your specific application. Follett's controller set point can be changed to deliver the required range in either °F or °C. Refer to page 6 for instructions on changing set point and/or display to °C.

Fig. 3



Reversing the door swing – optional

NOTICE

When reinstalling latch and hinge screws, 242 blue Loctite* MUST be applied to screws. Torque screws to 25 in-lbs.

1. Remove screws and latch from refrigerator cabinet (Fig. 4.1).
2. Use flat screwdriver to carefully remove (do not scratch) hinge covers (Fig. 5.1).
3. Support door and remove screws attaching hinge to refrigerator cabinet (Fig. 5.2).
4. Cover hinge screw holes with screw hole plugs removed from opposite side.
5. Reverse door. Apply 242 blue Loctite to hinge screws and reinstall torqued to 25 in-lbs.
6. Reinstall latch on opposite side.
7. Remove screws and handle from door (Fig. 6.1).
8. Rotate handle (Fig. 6.2).
9. Apply 242 blue Loctite to latch screws and reinstall torqued to 25 in-lbs.

Note: See keypad lock manual for reversing a door equipped with a keypad lock.

Fig. 4

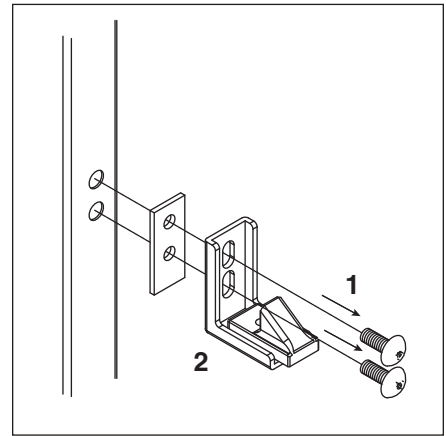


Fig. 5

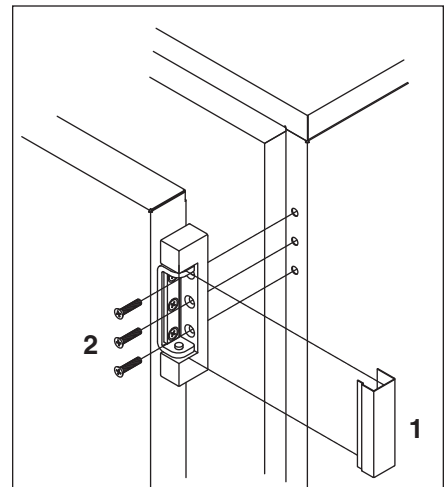
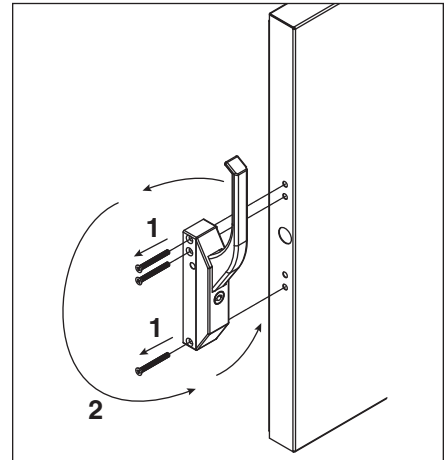


Fig. 6



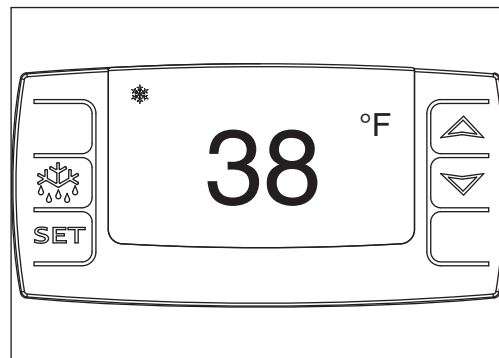
Controller operation

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

A snowflake LED displays when the compressor is running.

The controller is pre-programmed with a 34 F set point which provides a compressor cut-in at 38 F and cut-out at 34 F. This may not meet your specific application needs. For example, many pharmaceutical manufacturers recommend that their refrigerated medications be stored between 36 F and 46 F. Instructions for changing the set point are found below.

Fig. 7



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

Set point °F/°C	Cut-in/ Cut-out °F	Cut-in/ Cut-out °C	Normal display range temperature °F/°C
34° / 1.1°	38° / 34°	3.3° / 1.1°	32° - 38° / 0° - 3.3°
35° / 1.7°	39° / 35°	3.9° / 1.7°	33° - 39° / .6° - 3.9°
36° / 2.2°	40° / 36°	4.4° / 2.2°	34° - 40° / 1.1° - 4.4°
37° / 2.8°	41° / 37°	5° / 2.8°	35° - 41° / 1.7° - 5°
38° / 3.3°	42° / 38°	5.6° / 3.3°	36° - 42° / 2.2° - 5.6°
39° / 3.9°	43° / 39°	6.1° / 3.9°	37° - 43° / 2.8° - 6.1°
40° / 4.4°	44° / 40°	6.7° / 4.4°	38° - 44° / 3.3° - 6.7°
41° / 5°	45° / 41°	7.2° / 5°	39° - 45° / 3.9° - 7.2°

All set points have a 4 F differential (HY setting on the controller). The 4 F differential means that with a 34 F set point, for example, the compressor will turn off at 34 F and turn on when it reaches 38 F.

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 and °F will flash.
2	Press UP or DOWN arrows to desired cut-out temperature per above table	New cut-out temperature displayed.
3	Press and release SET	New cut-out temperature blinks three times, then current refrigerator temperature will display.

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 and DOWN ARROW buttons together for 3 seconds until “PoF” displays (will flash 3 times).
2. Programmer is now locked.

To unlock the controller

1. Press UP and DOWN ARROW buttons together for 3 seconds until “Pon” displays (will flash 3 times).
2. Programmer is now unlocked

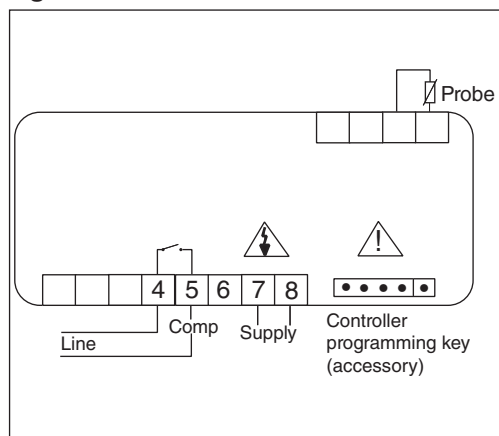
Controller programmer key (optional accessory)

Controller programming keys are available from Follett to provide fast and easy conversion of factory programmed controllers from °F to °C (service part number 00183327) or back to °F (service part number 00183319). In addition both programming keys will accept user programmed cut-out settings to allow fast and easy transfer of these user selected settings to multiple refrigerators.

Programming refrigerator from a key (download)

1. Turn OFF refrigerator.
2. Remove 6 screws from panel holding controller 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. TURN OFF unit.
8. Remove programming key.
9. Reinstall panel.

Fig. 8



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

Operation

The temperature control board 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 4 F 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 evaporator and condenser fan motors 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 evaporator and condenser fan motors and the compressor.

Any accumulated frost on the evaporator coils melts during the off cycle. The condensate drains to a plastic drain pan mounted above 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 34 F – 38 F. If desired, the cut-out temperature can be raised as high as 42 F by following the instructions on page 6 for changing the temperature set point. The 4 F cut-out differential will be maintained regardless of the controller set point.

Defrosting

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

Cleaning

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



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

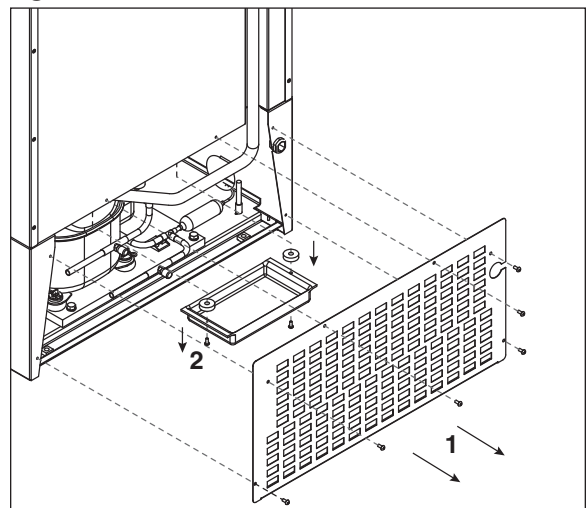
Exterior – Wipe exterior with a soft cloth in the direction of grain as needed. Stainless steel polish may be used to enhance the finish of the unit.

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 and rear panels (Fig. 9.1).
Note: Front louvered panel may be removed for more frequent cleaning of the condenser as needed
3. Remove drain pan (Fig. 9.2).
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 rear and lower front panels.

Fig. 9



Service

Latch adjustment

To adjust for proper latch engagement

1. Loosen striker plate mounting screws (Fig. 10.1).
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. 10.2).
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. 11.1).
2. Remove two screws and spacers securing condensate pan, and set pan aside (Fig. 11.2).
3. Remove two bolts securing condensing unit to refrigerator base (Fig. 11.3).
4. Gently slide condensing unit out (Fig. 11.4).

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

Fig. 10

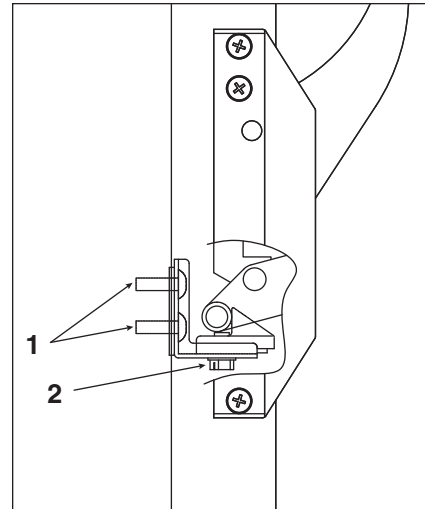
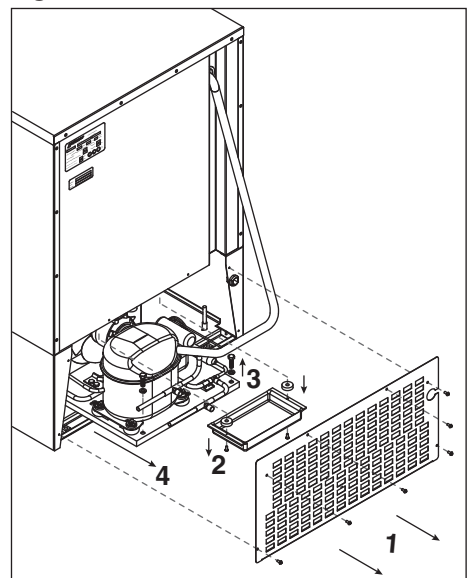


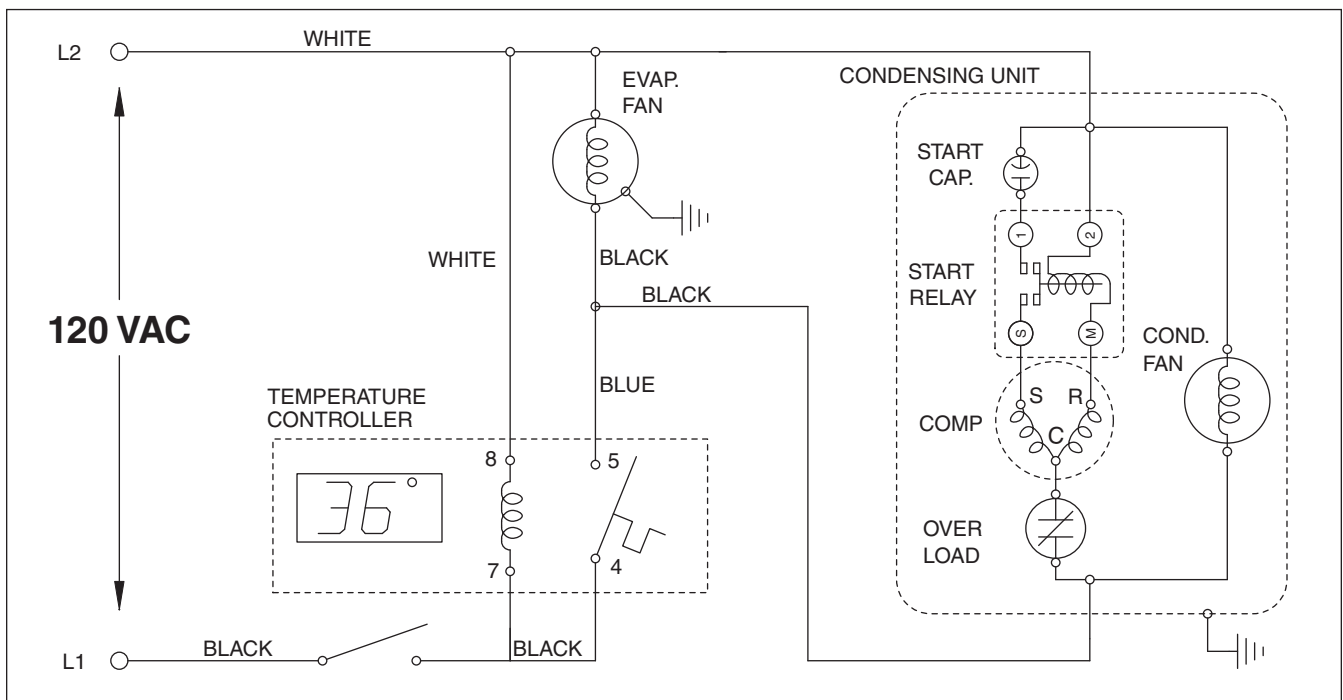
Fig. 11



Controller replacement

1. Disconnect power to unit:
 - a. Push front panel rocker switch to OFF position.
 - b. Switch circuit breaker to OFF position and disconnect power cord.
2. Remove 4 screws from front panel to access back of controller.
3. Disconnect front panel wiring harness from refrigerator at 5 pin connector.
4. Disconnect wiring from controller back.
5. Push in at center of orange* brackets to release and slide brackets back and off of controller.
6. Push controller out through front of front panel.
7. Insert controller through front of panel.
8. Slide brackets onto sides of controller and push against back of panel.
9. Reconnect wiring to controller.
10. Reconnect 2 and 3 pin connectors to refrigerator wiring harness.
11. Replace front panel, restore power and test operation. Reprogram replacement controller if necessary.

Wiring diagram



Refrigeration system

The REF 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 capillary tube 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.

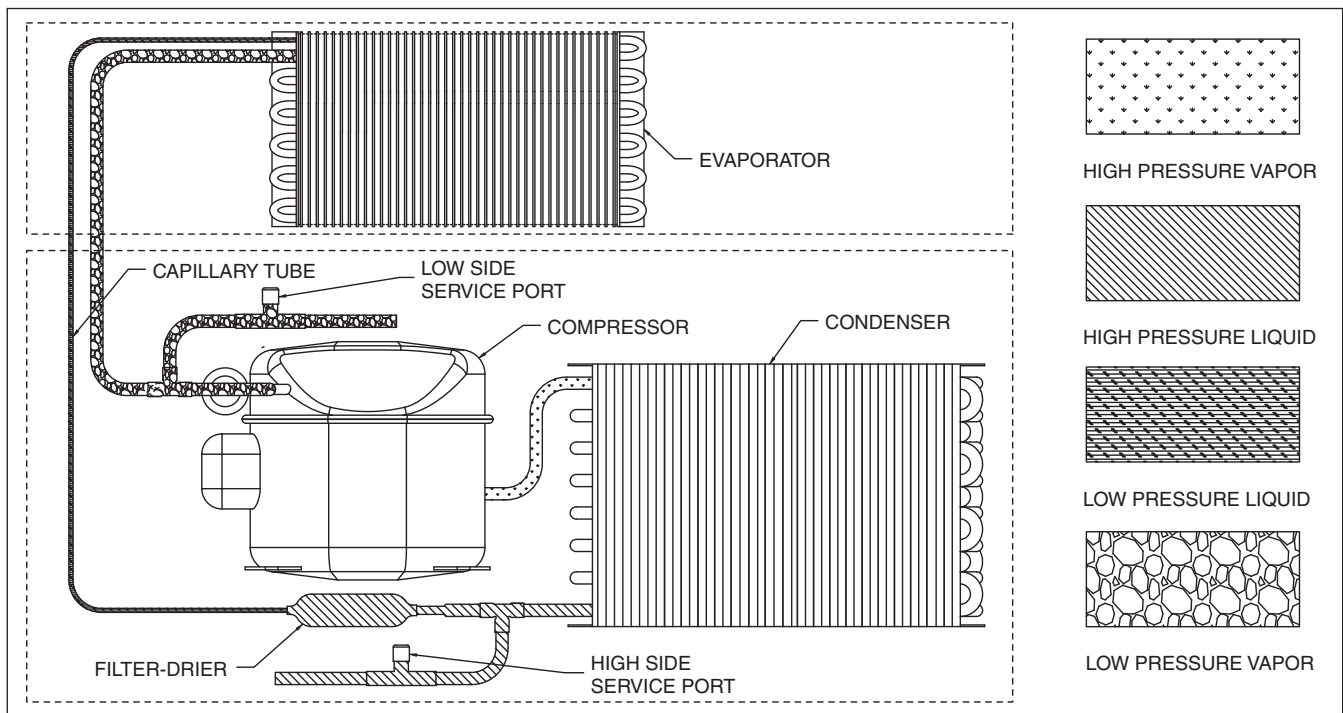
Checking refrigeration system pressures

1. Remove the rear access panel (Fig. 11).
2. Turn the power switch to the on position.
3. Following the instructions on page 6 verify that the temperature controller is set to the original factory cut-in setting of 38 F.
4. Allow the refrigerator 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.

Condensor inlet air temperature	70	80	90	100
Discharge pressure	198	230	270	311
Suction pressure	25	31	38	46

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

Refrigeration system diagram



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. 3. Excessively high ambient. 4. Refrigerant leak. 5. Incorrect refrigerant charge. 6. Plugged capillary tube. 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 capillary tube. 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.

Accessories

Temperature alarm

Before installing alarm

1. Remove supplied 9-volt back-up battery from packing box.
2. Remove 2 screws from module face and remove faceplate.
3. Install back-up battery on battery connector.
4. Locate DIP switches on the back of the faceplate (Fig. 12).
5. Review the factory DIP switch settings (Fig. 13) and make any changes required to meet the needs of your specific application.
6. Reinstall faceplate.

Fig. 12

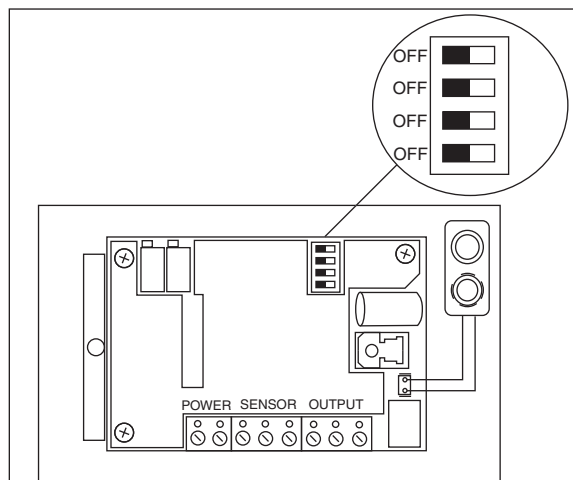


Fig. 13

Dip Switch	OFF (factory default setting)	ON
1	No alarm delay	45 minute alarm delay
2	Auto reset (alarm stops automatically as soon as temperature returns to set range)	Manual reset of alarm (user must press RESET button to stop audible alarm even if temperature has returned to set range)
3 & 4	Audible alarm on (no snooze with both off)	No audible alarm
3	Enables 5 min alarm “snooze” when reset button is pressed (3 off with 4 on)	Enables 45 min alarm “snooze” when reset button is pressed (3 on with 4 off)

Installing alarm

1. Mount alarm in desired location with screws (supplied by others) through back of housing. Do not place undue strain on probe cable.
2. Plug power cord into 110 outlet.
3. Push center tab of short bottle bracket into top of rear left pilaster (Fig. 14).

Note: Do not modify length of probe wire. Probe will not measure temperature correctly if wire length is changed.

4. Fill bottle with glycerin or other liquid to increase accuracy of readings by simulating the internal temperature of medications.
5. Insert bottle into bottle bracket.
6. Route probe through hole in refrigerator back and push probe down through gasketed bottle top.

Note: Alarm probe must be placed in bottle for proper system operation. Refer to Fig. 15 if attaching alarm to central monitoring or central alarm system. A SPDT 1 amp 24V AC resistive relay is provided for this connection.

Fig. 14

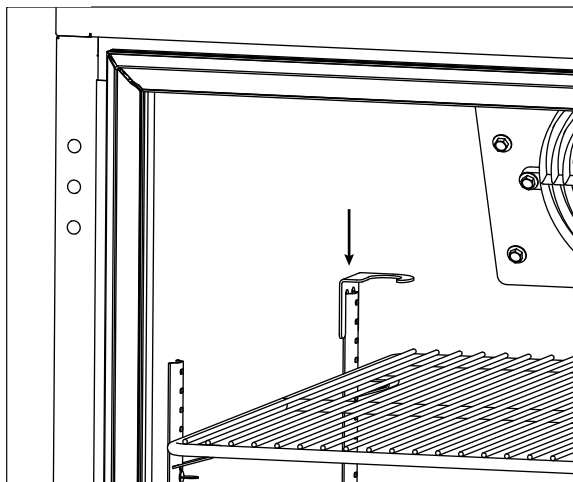
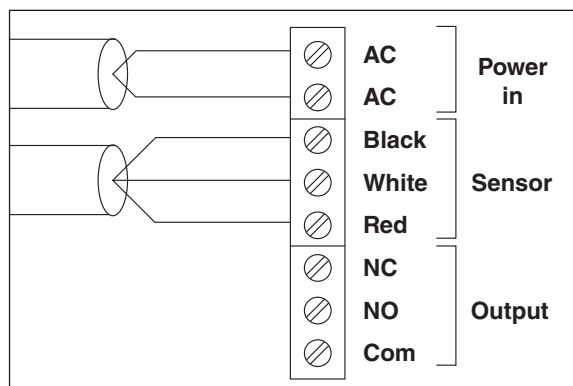


Fig. 15



Setting alarm temperatures

1. After the installation is complete, allow 30 minutes for the system to stabilize to ambient temperature.
2. Calibrate temperature alarm to refrigerator display
 - a. Calibration is best done with the alarm probe removed from the probe bottle and placed in the vicinity of the temperature controller probe. Allow at least 15 minutes for the probe temperature to stabilize.
 - b. Note the temperature value displayed on the refrigerator controller and subtract the temperature value displayed on the alarm. This value is the differential.
Example: Temperature controller: 36 F Alarm: 38 F
Controller – Alarm = Differential 36 – 38 = -2
 - c. Press SET until “CAL” is displayed (Fig. 16.1).
 - d. Press SET again to display “CAL” value (Fig. 16.1).
 - e. Press top or bottom of ADJUST arrow to display the calculated differential (-2 F in example above).
3. Set high alarm limit
 - a. Press SET until “HSP” is displayed (Fig. 16.1).
 - b. Press SET again to display HSP value (Fig. 16.1).
 - c. Press top or bottom of ADJUST arrow until desired HSP value is displayed (Fig. 16.2).
4. Set low alarm limit
 - a. Press SET until “LSP” is displayed (Fig. 16.1).
 - b. Press SET again to display LSP value (Fig. 16.1).
 - c. Press top or bottom of ADJUST arrow until desired LSP value is displayed (Fig. 16.2).
5. Display will return to temperature display in approximately 15 seconds.
6. Place alarm probe back in probe bottle.

Viewing high/low log

Follett's alarm module allows users to view the highest and lowest temperatures recorded since the last time the RESET button was pressed.

To view high and low log values

1. Press SET button until “HI” appears.
2. Press SET button to view HI log value.
3. Press SET button until “LOW” appears.
4. Press SET button to view low log value.
5. Press RESET button to clear log.

Alarm operation facts

The back-up battery will continue to provide alarm protection during power failure but will alarm ONLY if temperatures go out of the selected range. During power failure the alarm face will be dark but temperatures can be read by pressing the RESET button.

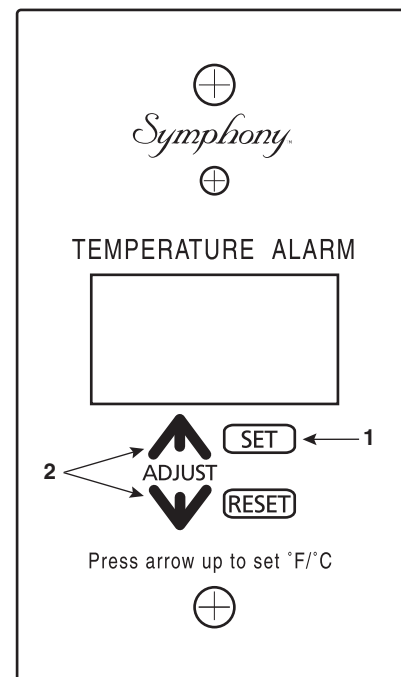
Because the temperature alarm display simulates the true temperature of stored medications rather than the air temperature inside the refrigerator, we suggest that staff refer to the alarm display to log temperatures for JCAHO compliance.

Automated medication dispensing and inventory systems interface

(Pyxis®, Omnicell®, MedSelect®, etc.)

Follett refrigerators and freezers are compatible with most major automatic medication and inventory systems. In some cases a Follett bracket accessory is required. Contact factory for further information.

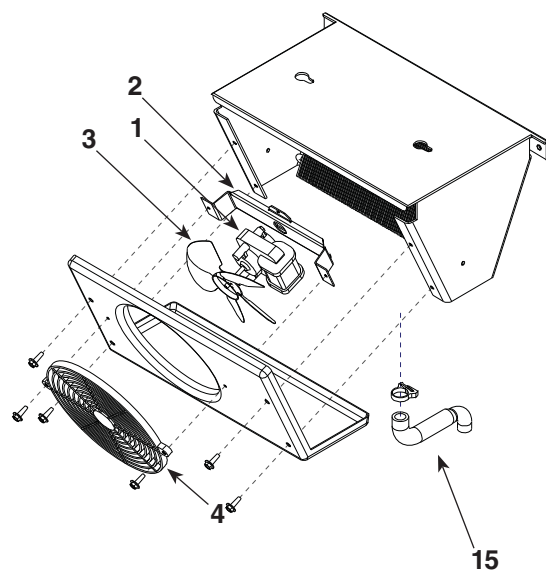
Fig. 16



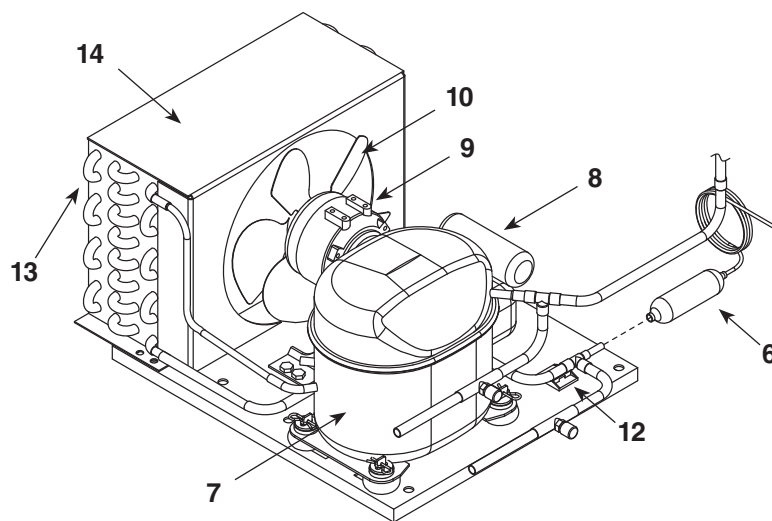
Replacement parts

Order parts online
www.follettice.com

Evaporator - Reference #5

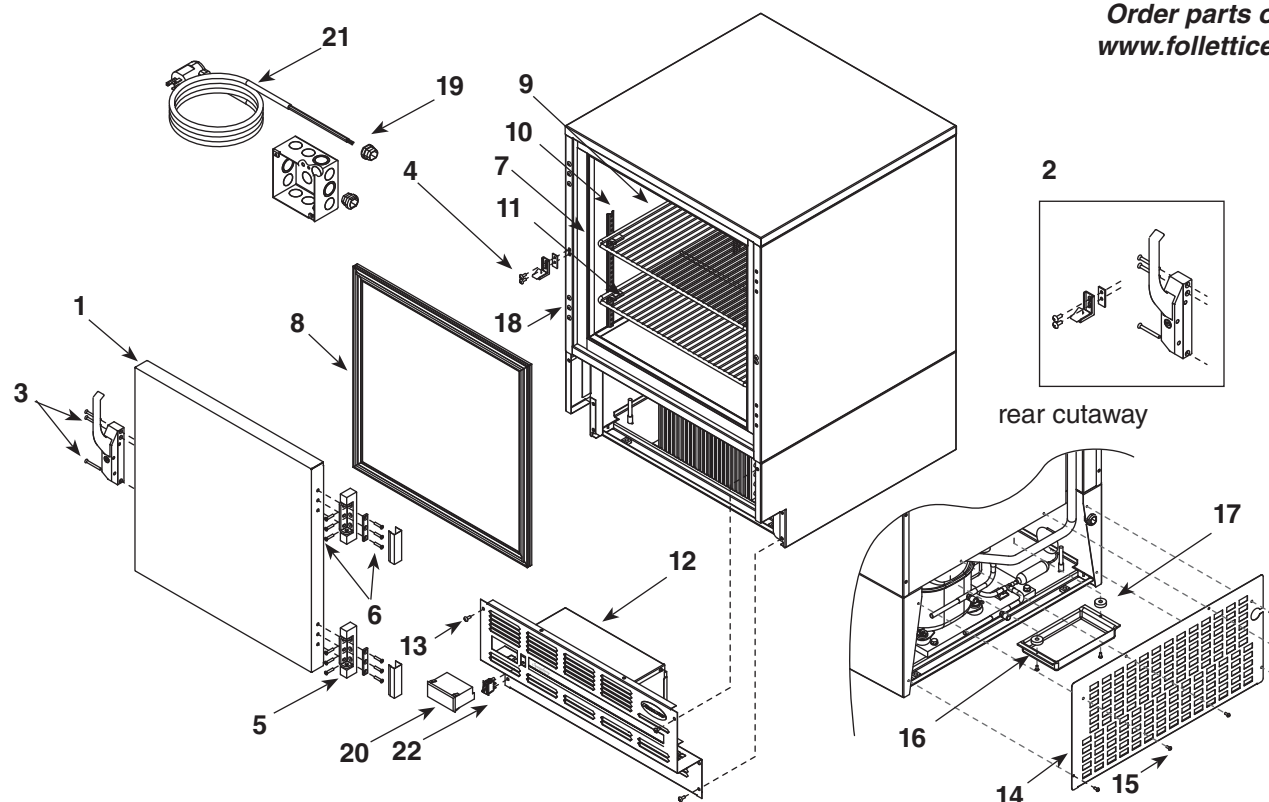


Condensing unit - Reference #11



Refrigeration

Reference #	Description	Part #
1	Fan motor, evaporator	00104919
2	Bracket, fan motor	00104927
3	Fan blade	00104935
4	Fan guard	00104943
5	Evaporator (includes parts above)	00104885
6	Filter drier & capillary tube	00103267
7	Compressor	00104950
8	Starting capacitor	00104968
Not shown	Starting relay	00104976
Not shown	Overload protector	00104984
9	Condenser fan motor	00104992
10	Condenser fan blade	00105007
Not shown	Fan motor bracket	00157412
11	Condensing unit	00105106
12	Wiring strain relief	00105577
13	Condenser	00105619
Not shown	Cap, starting capacitor	00105627
14	Shroud, condenser	00157347
15	Drain tube, evaporator (includes clamp)	00121681



Hardware

Reference #	Description	Part #
1	Door, REF5 (includes gasket – 21 3/8" x 21 3/8")	00105015
Not shown	Door, REF4-ADA (includes gasket – 21 3/8" x 18 5/8")	00113910
2	Latch & striker (includes screws)	00105023
3	Latch screws (each – 3 per latch)	00103507
4	Striker screws (each – 2 per striker)	502287
5	Hinge (each – 2 required, includes screws)	00105031
6	Hinge screws (each – 6 per hinge)	00105080
7	Strip sealer (set of 4), REF5	00130138
Not shown	Strip sealer (set of 4), REF4-ADA	00130146
8	Gasket, REF5 (21 3/8" x 21 3/8" door)	00125732
Not shown	Gasket, REF4-ADA (21 3/8" x 18 5/8" door)	00127738
9	Shelves, full (each)	00103283
Not shown	Shelf, upper (cut out)	00127753
10	Pilaster (each)	00105346
Not shown	Thumb screws (set of 8)	00105353
11	Shelf support (snap-in, each)	00156240
12	Lower front panel (includes 00114371 and screws)	00130120
13	Front panel screws (each – 6 per panel)	00105379
14	Rear panel (includes screws)	00130161
15	Screws, rear panel (each – 6 per panel)	00105387
16	Condensate tray (includes screws & spacers)	00103275
Not shown	Key	00105072
17	Spacer, condensate pan	00105098
Not shown	Seal, bushing, rear panel	00114512
18	Finishing plug	00105536
Not shown	Leveling leg	00128900
19	Strain relief, power cord	00105403

Electrical components

20	Temperature controller	00183293
Not shown	Temperature probe and harness	00183731
21	Power cord	00103903
22	Power switch, recessed mount	00114371
Not shown	Strain relief, wiring, front panel	00105577
Not shown	Programming key °F	00193342
Not shown	Programming key °C	00193359

Temperature alarm accessory

Not shown	Bottle kit (includes bottle, bracket and gasket)	00113779
Not shown	Controller kit (includes battery, probe and power supply)	00108175
Not shown	Gasket, bottle	00112029
Not shown	Bracket, bottle	00112011
Not shown	Bottle	00112037
Not shown	Battery	00112177
Not shown	Screws, (includes two for securing cover)	00115063
Not shown	Label, controller cover	00115071
Not shown	Temperature probe	00115097

Door brackets for medication dispensing systems

Not shown	Omniceil door bracket	00158014
Not shown	Pyxis door bracket	00114702

