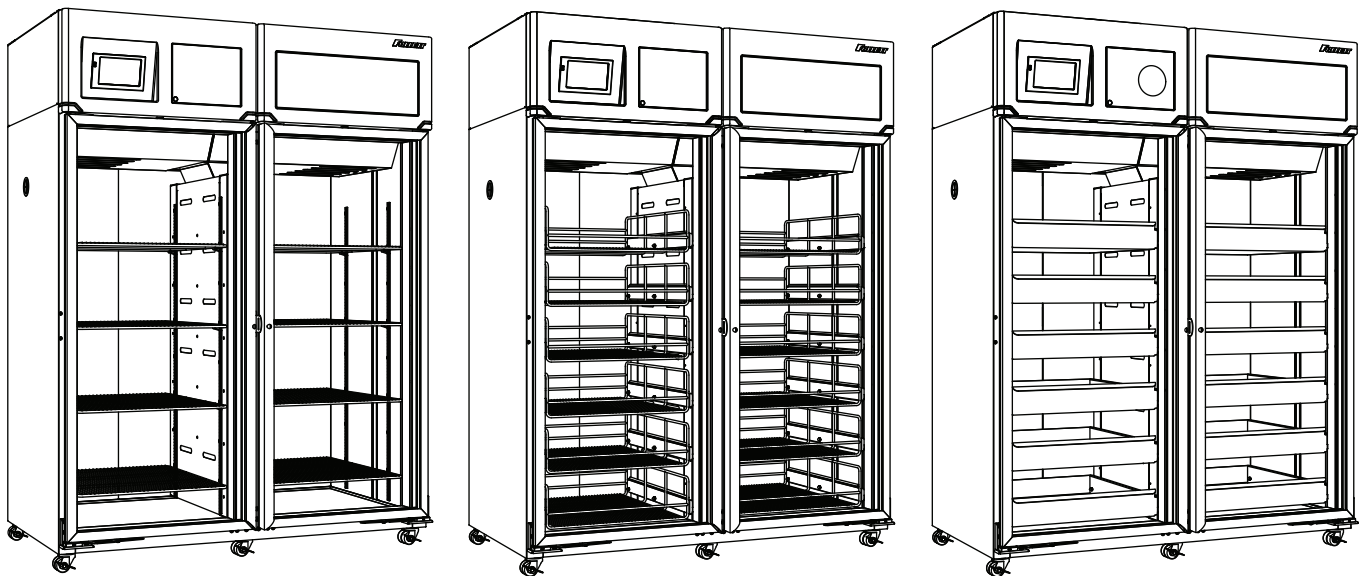


REF 45 – LB
REF 45 – PH
REF 45 – BB

Order parts online
www.follettice.com

Installation, Operation and Service Manual



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

FOLLETT®

801 Church Lane • Easton, PA 18040, USA
Toll free (877) 612-5086 • +1 (610) 252-7301
www.follettice.com



01147842R00

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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 (877) 612-5086 or +1 (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 LLC so that we can help in the filing of a claim, if necessary.

Check your paperwork to determine which configuration you have. Follett configuration numbers are designed to provide information about the type of refrigerator you are receiving. Following is an explanation of the different item numbers.

Model						
						Cubic foot capacity – 45
						Configuration – LB (Laboratory - shelves), PH (Pharmacy - baskets) BB (Blood bank - drawers)
						Door hinge – 0 (double doors, handles in center), R (both mounted with right-hand hinge), L (both mounted with left-hand hinge)
						Door heater option – 00 (No door heater), HT (door heater)
						Keypad – 00 (standard key-locked doors), KP (for keypad electronically-locked doors)
						Door style – S (Solid stainless steel), G (Glass)
REF	45	LB	R	00	00	S

Specifications	Specifications		
	REF45-LB	REF45-PH	REF45-BB
Capacity	20.6 cu ft (583.3 L) per side	20.6 cu ft (583.3 L) per side	20.6 cu ft (583.3 L) per side
Storage system	(8) epoxy-coated shelves	(12) epoxy-coated rollout baskets	(12) stainless steel rollout drawers
Exterior width	59.75" (151.8 cm)	59.75" (151.8 cm)	59.75" (151.8 cm)
Exterior depth	30" (76.2 cm)	30" (76.2 cm)	30" (76.2 cm)
Exterior depth with handles	33.55" (85.2 cm)	33.55" (85.2 cm)	33.55" (85.2 cm)
Exterior height with casters	79.54" (202 cm)	79.54" (202 cm)	79.54" (202 cm)
Interior dimensions (w x d x h)	54" x 27" x 54.3 (61 cm x 73 cm x 143 cm)	54" x 27" x 54.3 (61 cm x 73 cm x 143 cm)	54" x 27" x 54.3 (61 cm x 73 cm x 143 cm)
Crated weight	760 lbs (345 kg)	880 lbs (399 kg)	920 lbs (417 kg)
Max. heat rejection	5240 BTU/hr (1536 W)	5240 BTU/hr (1536 W)	5240 BTU/hr (1536 W)

Standard features – all models	
Door	– Glass: Dual pane, low-E glass, condensation free to 80 F (27 C) air/60% RH – Solid: Stainless steel, foam-insulated door.
Door handle	ADA-compliant, full length handle with integral lock
Interior/exterior material	Heavy-duty, corrosion resistant stainless steel
Casters	(6) dual-wheel swiveling casters with toe locks
Insulation	2.75" (7 cm) thick, CFC-free foam insulation throughout
Lighting	(2) full length side LED lights
Air circulation system	Ducted air through 24 center plenum openings with front face return
Temperature probe	Stainless steel RTD (platinum resistance temperature device) top, bottom probe standard on - BB models, available as option on -LB, -PH models, immersible with panel quick-disconnect

Ambients

Intended for indoor use where ambient temperature typically does not exceed 80 F (27 C) and ambient relative humidity does not exceed 60% RH. A heated door is recommended for higher humidity ambients.

Clearances

The top of the refrigerator must have 16" (40.64 cm) of clear space above to ensure proper ventilation of the refrigeration system.

The back of the refrigerator should have 2" (5 cm) of clearance to allow for power cord clearance.

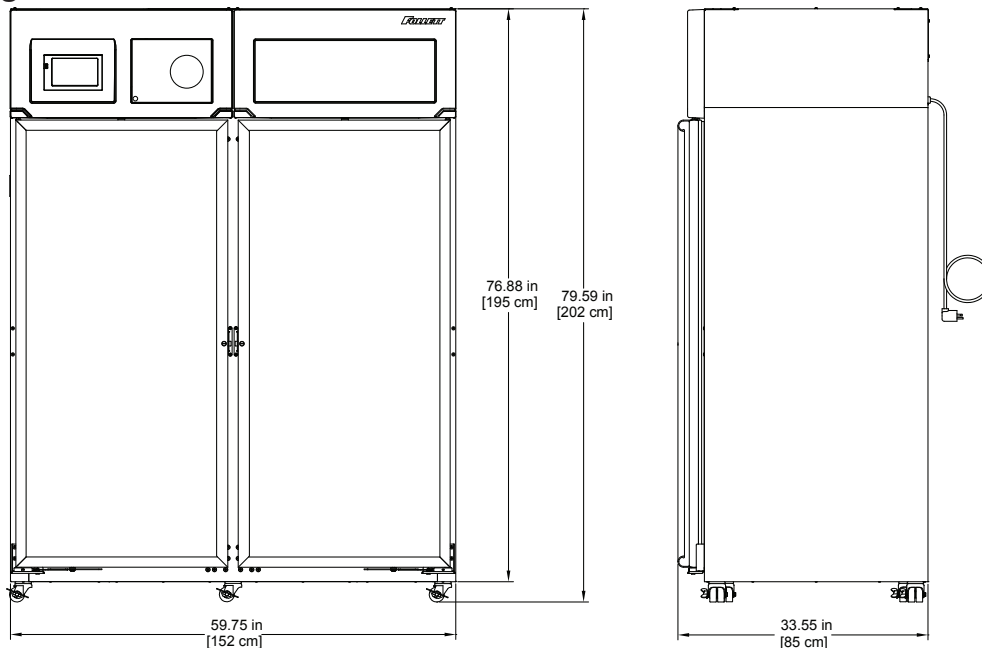
Electrical specifications

- 115 V, 60 Hz, 1 phase
- Full load amps: 11A
- Maximum size of branch circuit overcurrent device: 20A dedicated circuit
 - Refrigerator is supplied with a NEMA 5-20 hospital-grade plug.
 - Follett recommends circuit be protected by GFCI.

Refrigeration specifications

- Refrigerant R134a, 13 oz (369 g)

Detail drawing



Installation

DANGER



- Do not tilt any unit further than 30° off vertical during uncrating or installation
- Refrigeration module area contains mechanical, moving parts. Keep hands and arms clear of this area at all times. If access to this area is required, power to unit must be disconnected first.

1. For standard key lock units, remove key attached to door.
2. For keypad units, open door to right of the touchscreen and connect back-up battery pack. Enter the default user code (1 2 3 4 5 6) and press the check mark to open the door (see Page 7).
3. Remove casters from box located inside cabinet. Once the casters are removed, disconnect back-up battery pack until unit is installed at its final destination.

Note: California facilities requiring floor anchors, refer to wall anchor kit instructions (P/N 00938241) packed with seismic kit before proceeding with caster installation.

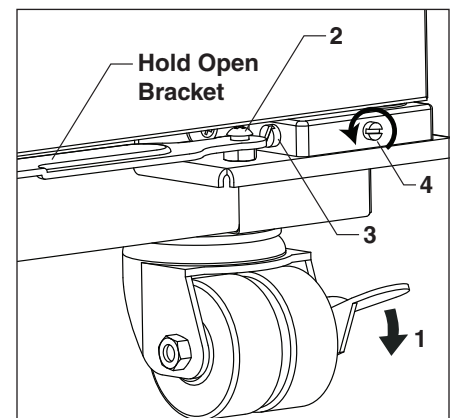
4. Unbolt refrigerator from pallet.
5. Remove wood block under each door.
6. Push left or right side of refrigerator approx. 6" (15.3 cm) off the pallet and install two casters. Tighten with channel locks until caster meets bottom of cabinet.
7. Continue sliding the refrigerator off the pallet until 55% is off the pallet and install the center casters and tighten.
8. Continue sliding until 95% of unit is off of pallet
9. Grab pallet and rotate exposing 1 of the remaining casters nuts (located on the bottom of the unit) and install caster.
10. Continue rotating pallet until last remaining caster nut is exposed. Install final caster.
11. Remove unit completely from pallet.



Adjust self-closing door

1. Roll refrigerator to desired location and lock as many casters as possible (**Fig 1.1**).
2. If the door appears to be sagging, remove the Phillips screw (**Fig. 1.2**) holding the Hold Open Bracket to the Hinge Bracket to gain access to the Sag Adjustment Screw (**Fig. 1.3**). Turn the Sag Adjustment Screw to align the door squarely with the freezer cabinet. When finished, reinstall the Hold Open Bracket.
3. Check door for closing tension and adjust if necessary. To check closing tension, open door 1" (2.54 cm) and turn screw (**Fig. 1.4**) counterclockwise until you achieve positive close. Then, turn another half turn counterclockwise.

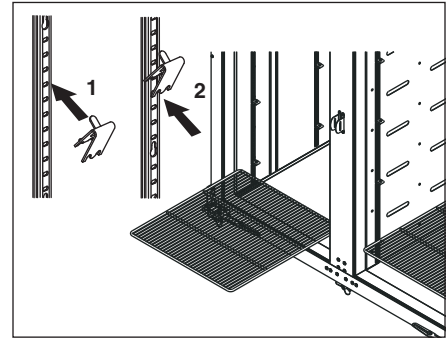
Fig. 1



Install shelves (if equipped) and power up

1. If refrigerator is equipped with shelves, remove bag containing shelf supports and position them in desired locations on each pilaster and insert shelves (**Fig. 2**).
2. Plug refrigerator into a 115 V, 60 Hz, 15A dedicated outlet.

Fig. 2

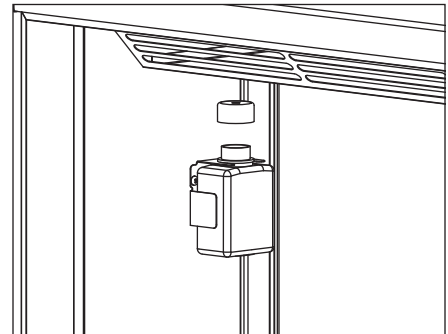


 DANGER	
	• Do not extend all of the drawers or baskets when fully loaded to avoid the possibility of the refrigerator tipping forward • Refrigeration module area contains mechanical, moving parts. Keep hands and arms clear of this area at all times. If access to this area is required, power to unit must be disconnected first.

Fill product bottle

1. Remove probe and cap from the top bottle and fill with glycerine supplied with unit (e.g., 50% glycerine and 50% water) (**Fig. 4**). Replace cap and reinsert probe sensor.
2. If equipped with a bottom probe, perform same procedure for bottom bottle.

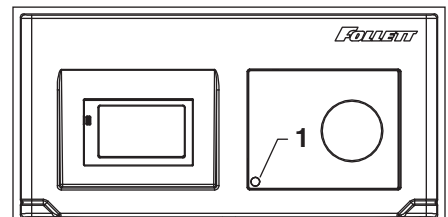
Fig. 3



ATTENTION INSTALLER
<i>It is imperative that the top/bottom probe bottle be filled with a solution that your facility uses to ensure proper operation of unit.</i>

3. Adhere supplied probe wire clips (x4, packaged with manual) to inside wall leading to the probe bottle.
4. Route probe wire into clips and close the clips.

Fig. 4



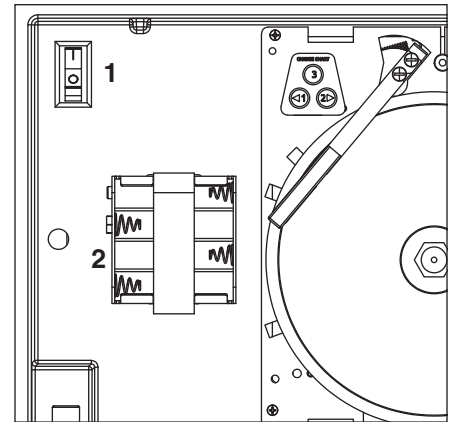
Power the Unit

1. Press lower left corner of front façade door to access power switch inside (**Fig. 4.1**).

2. Press power switch to turn unit on (**Fig. 5.1**).
3. Connect wiring harness to back-up battery pack and connect 9 V chart recorder back-up battery (if equipped) (**Fig. 5.2**).

Note: Acknowledge low-battery alarm icon if present.

Fig. 5



Controller Operation

Use and care of the LCD touchscreen

The LCD touchscreen utilizes capacitive touch technology. This will allow you to engage the functionality by touching the screen with your fingers, even while you are wearing latex or cotton gloves. Functionality will not engage by touching with an inanimate object, such as a pen or stylus.

- To preserve optimal touch sensitivity, keep the screen clean by using a clean, dry cotton cloth.
- Do not expose the screen to liquids or excessive dust, heat or humidity.

Control function icons and navigation buttons engage functionality of the user interface. Status indicators alert the user to a change of status.

Home screen

The home screen consists of three primary information areas: the temperature display, control function display zone and system status display.

Control Functions



Settings



Alarming



Light



Information log



Help

System Status



Compressor is running



Evaporator fan is running



Door is open



Defrost cycle is in process

Functions and Settings



USB download available
(downloading when blinking)



Refrigeration set points



Sleep functions



Centigrade to Fahrenheit



Probe set points



Alarming functions



Alarm mute



Reset

- Product temperature is displayed in the upper right corner.
- Current selected display probe above temperature readout.
- Primary control function icons are displayed in the lower left corner.
- System status icons will display in lower right corner to indicate a condition has been activated.

Fig. 6

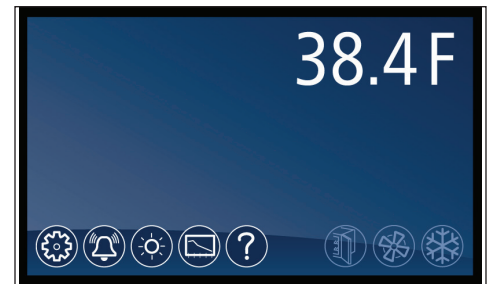


Fig. 7



High and low temperature display

From the home screen touch the temperature display in the upper right corner. The high/low temperatures will appear below the temperature display. To the left of the high/low temperature, a time and date stamp will be displayed.

View the bottom probe temperature and min/max temperature log

1. Press the temperature display in the upper right hand corner of the display
 - Will initially display MIN/MAX temperature of Top probe.
2. Press a second time to prompt a reset Top probe MIN/MAX.
3. Press a third time to display HIGH/LOW alarm settings.
4. Press a fourth time to display current Bottom probe temperature.
5. Press a fifth time to display Bottom probe MIN/MAX temperature.
6. Press a sixth time for prompt to reset Bottom probe MIN/MAX temperature log.

Reset the high and low temperature log

Touch the temperature display a second time and the reset function ⓘ will appear under the high/low temperature. Touch the reset icon and a yellow message box will appear. Press ✔ to confirm reset or ✕ to cancel.

Alarm set point display

From the home screen touch the temperature display three times. The high and low alarm set point will appear under the temperature.

Help

- Help is available at any time by touching the ⓘ icon at the bottom of the screen.
- Help is screen-specific; touching the ⓘ icon will display an explanation of the functionality and use of the screen you are currently viewing.
- Touch ✔ to exit help screen.

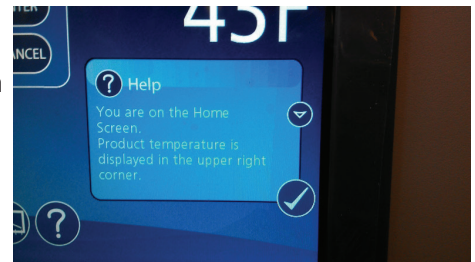
Fig. 8



Fig. 9



Fig. 10



Settings

- Refrigeration Set Point 
 - Touch the number displayed in the box to the right of the Set point label and use the keypad or **UP** and **DOWN** arrows to select product temperature. Press  to accept or  to cancel.
- Sleep Temperature Display 
 - Toggle **ON** to hide the temperature reading immediately on the home screen.
- Set the Sleep Delay 
 - To automatically hide the temperature after 0-600 seconds of inactivity, touch the box to the right of the delay (0-600) box. Use keypad or **UP** and **DOWN** arrows to select from 0-600.
- Temperature 
 - Toggle between **F** and **C** to select Fahrenheit or Celsius.
- Brightness 
 - Touch the number displayed in the box to the right of the Brightness  icon and use the keypad or **UP** and **DOWN** arrows to select from 1-10. Press  to accept or  to cancel.

System Information

- Touch the System Info icon  to display the model number, unit serial number and software version. Touch the checkbox icon  in the lower right corner of the box to clear.

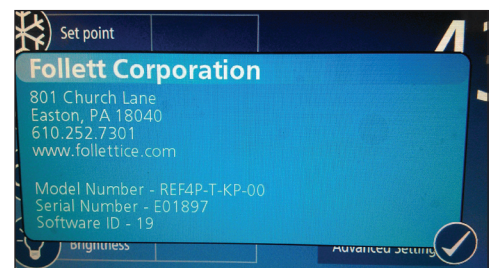
Fig. 11



Fig. 12



Fig. 13



Alarm or Alert Notifications

- If an alarm or event condition is detected and an alarm is engaged, an alert notification will appear in the left center of the screen with an explanation of the alert condition and a checkbox  at the bottom right of the alert box.
- No further action can be taken on the User Interface until the alert condition is acknowledged and cleared by touching the checkbox .
- Mute 
 - Touch the  icon to mute audible alarm for 15 minutes.

Door Switch

- This unit is equipped with a door switch that is located in the façade, and a magnet located on the top of each door. With the door closed, the switch reads closed. When the door is opened, the switch contacts open and turn on the LED lights.

Door Alarm

- This unit is equipped with a door ajar alarm that is factory set for 1 minute. In the event the door switch reads open for longer than 60 seconds (default) an audible and visual alarm will occur. The alarm will clear when the door is closed. The door alarm activation time can be changed from 0-600 seconds in the Advanced Settings Menu under Door Open Alarm Delay.

Power Alarm

- This unit is equipped with a Power Alarm that will sound if the unit loses power for more than five minutes. The Power Loss Alarm box will display every five minutes, then the screen will sleep. An audible alarm will sound every 30 seconds during the power failure. An alarm box will be displayed when power is restored. The event log will record the exact time and date of the power loss and when the power was restored.

Start-up alarm delay

This unit has a 375 minute time delay between when the unit is energized to when the temperature alarms become active. This delay can be changed in parameters in the controller under **Alarm Startup Delay**.

Setting Alarms

- Alarming Settings control the conditions and timing of event and alarm conditions that result in audible and/or visual alerts.
- To change the high alarm set point, touch the number displayed in the box to the right of the  icon and use the keypad or **UP** and **DOWN** arrows to select an alarm value. Press  to accept or  to cancel.
- To change the low alarm set point, touch the number displayed in the box to the right of the  icon and use the keypad or **UP** and **DOWN** arrows to select alarm value. Press  to accept or  to cancel.
- Audible Alarm 
 - Toggle between **ON** and **OFF** to engage and disengage the audible alarm function.
- Mute 
 - Touch the  icon to mute audible alarm for 15 minutes.

Fig. 14

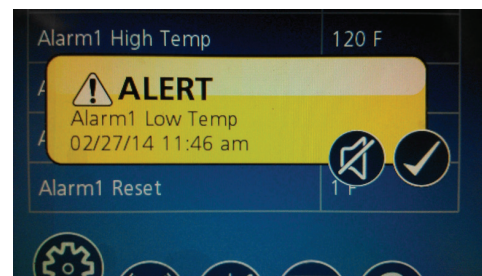
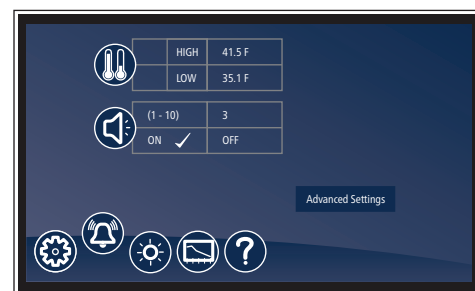


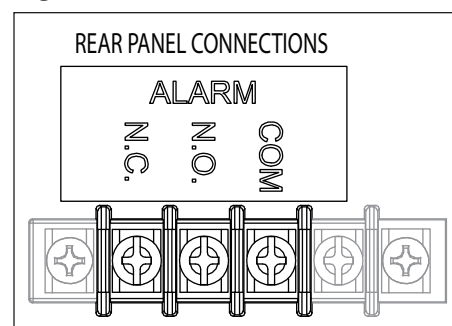
Fig. 15



Alarming Contacts

This unit is equipped with dry contacts that may be connected to a third party monitoring system. The contacts are located on the back of the façade. Touchscreen units utilize the Alarm 1 parameter. Each set of dry contacts has a Common, a Normally Open and a Normally Closed connection point. By default, Alarm Relay 1 is set to activate with any of the following alarms: Alarm 1 High temp, Alarm 1 Low temp, Door Open Alarm, and Power Loss Alarm.

Fig. 16



Probe calibration

The temperature probes can be offset -9.9 to $+9.9$ in the Advanced Menu settings to deliver a more precise temperature reading.

1. Select Settings
2. Select Advanced settings and enter code 1,1,1,1. Press  to confirm.
3. Using the DOWN arrow, scroll through Advanced Settings to Calibrate screen and select Calibrate
4. Place desired probe (P1-control, P2-Defrost, P4-Top probe, P5-Bottom probe) in an ice bath and allow 3-5 minutes for temperature stabilization.
5. Press "Offset" and use the UP/DOWN arrows to offset the probe reading to the proper value.

Note: In the event of a factory reset, the offset value will return to 0.

Screen saver

The screen saver will replace the home screen and display a blank screen, time and date, or the temperature. When the screen is touched or the unit has an alarm or event, it will return to the home screen. The screen saver can be changed in the advanced setting.

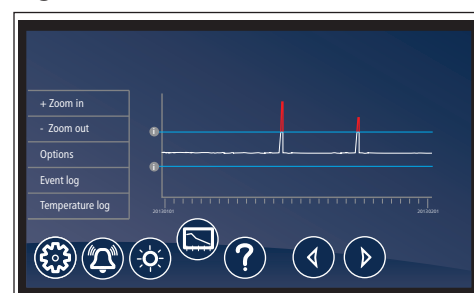
Screen saver function: blank, time and date, or temperature.

Screen saver time (sec): 0–600 seconds between the last touch of the screen to the activation of the screen saver.

Information Logs

- All available graphs, data logs and event logs are accessed through the Information Logs function. The home screen in the Information Logs section displays the product (P4) temperature graph with one week's data. Date and time information is displayed on the horizontal axis.
- This unit comes factory set to display only the product temperature (P4) on the graph. All of the probes can be viewed on the graph if desired. Probes can be added to the graph through the advanced setting under DATALOG. P1 and P5 (Bottom Probe, if equipped) can be added by selecting the probe and changing the parameter from No to Yes. The selected probe will now display on the graph.
 - P1 control, P4 (Top Probe), P5 (Bottom Probe)
- Zoom in (+) or Zoom out (–) on an event/temperature on the home screen will change the time scale.
- Using the left and right arrows below the graph will scroll the graph. All the stored temperature data on the graph is viewable.

Fig. 17



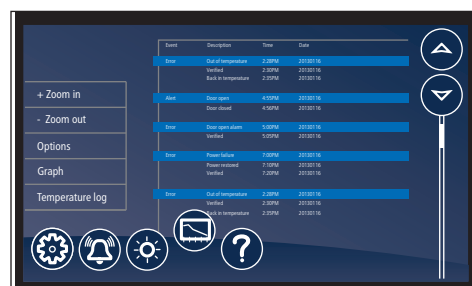
- **Temperature Log** – to display a chronological listing of logged temperatures (latest logged temperature will display first), touch the **Temperature Log** label to the left of the screen. Use the **UP** and **DOWN** arrows to the right of the screen to scroll through the logged temperatures.

Fig. 18



- **Event Log** – to display a chronological listing of events (including errors, alarms and alerts), touch the **Event Log** label to the left of the screen. Use the **UP** and **DOWN** arrows to the right of the screen to scroll through the logged temperatures.

Fig. 19



Data logging

- The controller is capable of storing up to 50,000 readings per probe. The factory setting for the sample rate is every 15 minutes, which will provide enough storage for 520 days. The sample rate can be change to provide data logging for a longer or shorter time interval by changing the **Sample Rate (Min)** in the advanced settings menu. **0 = off and 360 minutes maximum.**

Data Storage

- Data can be captured in different ways. The factory default is for the data to overwrite itself when the memory is full. This can be changed in the advanced setting under **Data storage overwrite**. When this parameter is set to **No**, the system will display an alert when the memory is 75% full. To clear the alert the data must be downloaded.

Data duration alarm

- A reminder can be set to download the data in the **Data duration alarm** in the advanced setting. The data duration can be set from **1 to 180 days**. If the data duration alarm is used, then the **Alarm on data full** parameter in the advanced setting must also be set to **Yes**.

Downloading data

- The touchscreen has the capability of downloading the temperature data and event log via a USB port on the left side of the user interface. The file is a CSV format and is suitable for import directly into Microsoft Excel.
1. Insert the storage device in the USB slot located to the left of the Touchscreen.
 2. Select the Graph icon along the bottom of the Touchscreen.
 3. Select the USB icon in the lower right hand corner.
 4. A yellow alert box with **downloading data** will appear.
 5. Press  to accept or  to cancel.
 6. After the unit is done downloading, a second yellow alert box will appear asking if you want to **Erase log**.
 7. Press  to accept or  to cancel.

Note: If you chose to erase the data, the data duration timer and the data full alarm will reset. It will also erase the information that is stored on the graph.

One of the two files below will be downloaded depending on which screen is being viewed:

EL XXXX YY - Event Log

TL XXX YY - Temperature Log

XXXX = last 4 digits of serial number

YY = 0-99 number of downloaded file

Data download reminder and data full alarm

- If you plan or are required to download data for a certain time period, you can set a **download data reminder** on the unit. Download data reminder can be found in the advanced setting under **Data duration** and can be set from **1 to 180 days**.

Follett Keypad Lock – (Optional)

For units equipped with the electronic lock accessory option, a keypad will be displayed on the left side of the touchscreen. In order to gain access to the storage area, a user code must be entered.

- User default code is factory set to **1 2 3 4 5 6** and is stored in memory slot 01.

Fig. 20



Fig. 21



Fig. 22



Changing and Adding the User Codes

1. Touch Settings  icon.
1. Touch **Advanced Settings**, enter your 4-digit user access code (factory default is **1 1 1 1**) in the keypad that appears, and touch the checkmark icon  to access advanced settings screens.
2. Time and date will be displayed. Scroll using the **UP** and **DOWN** arrows until **Change Access Code** is displayed in the Display Setup screen.
3. Touch **Change Access Code** and enter the master code **[ENTER]**. (By default, the master code is **1 2 3 4 5 6**.)
4. Touch the screen to the right of the user code 2 to 40 to overwrite or add the user code.
5. Enter the new code. Press  to accept or  to cancel.
6. Enter the new code again. Press  to accept or  to cancel.
7. Press **DONE** when finished entering access codes.

Fig. 23

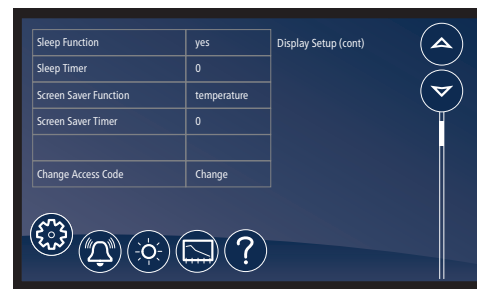


Fig. 24



Electronic Lock Override

- Remove safety screw using a T25 torx bit.
- Place thin screwdriver into rivnut where safety screw was removed and press the latch.
- Open door.

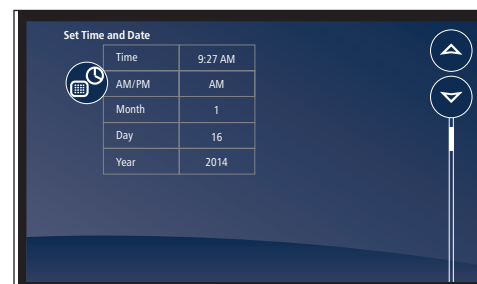
Light

- To turn the interior light on (or off), touch the Light icon or the Light Off icon.
- Light timer is in advanced settings.
- The light will also come on when the door is open.

Time and Date

- To set time and date, press the Settings  icon.
- To display options, touch **Advanced Settings**, enter your 4-digit user access code in the keypad that appears, and touch the checkmark icon  to access advanced settings screens (factory default is **1 1 1 1**).
- Time: touch displayed time and use the keypad to enter the time. Press  to accept or  to cancel.
- AM/PM: touch displayed value to toggle between AM and PM.
- Month: touch number displayed and use the keypad to enter the month. Press  to accept or  to cancel.
- Day: touch number displayed and use the keypad to enter the day. Press  to accept or  to cancel.
- Year: touch number displayed and use the keypad to enter the year. Press  to accept or  to cancel.

Fig. 25



Advanced Settings

- Touch **Advanced Settings**, enter your 4-digit user access code in the keypad that appears, and touch the checkmark icon  to access advanced settings screens (factory default is **1 1 1 1**).

Advanced Setting - touchscreen

Parameter	Default Value	Range	Description
Set Time and Date			
Time	7:45	0-12	Holds Hour
AM/PM	AM	AM, PM	Holds AM/PM
Month	12	1-12	Month
Day	16	1-31	Day
Year	2013	2010-2099	Year
System Information			
Serial Number	E12345	—	—
MC Version	33	—	MC version
EMC version	2	—	EMC version
UI version	17	—	UI version
Keypad version	2	—	Keypad version
Display Setup			
Beeper Function	ALL	Off, All, dr, Alr, Err	Controls the audible beeper function on the controller. Off (all off), All (all on), Door (dr), Alarm (Alr), Error (Err).
Beeper Volume	5	0-10	Beeper.
Button Clicks	Yes	Yes, No	Sets if a beep should sound each time a button is pressed.
Display Probe	RTD1 (P4)	Control (P1), P4, P5	The probe to display on controller.
Resolution	Int	Dec	Integer or decimal
Sleep Function	Yes	Yes, No	Sleep function will blank the screen after 0-600 seconds of non-use.
Sleep Timer	0 seconds	0-600 seconds	Amount of time before the screen blanks automatically.
Screen Saver Function	Temperature	Blank, temperature, date/time	Screen saver function will hide the home screen. It will display a blank screen, temperature, or time and date.
Screen Saver Timer	0 seconds	0-600 seconds	Amount of time before the screen saver initiates.
Change Keypad Access Code	Change	—	Allows entry/editing of keypad access codes. Password required.
Control Setup			
User Set Point	3.3 C (38 F)	LSP-USP	The temperature setpoint that the user adjusts.
Differential	2.2 C (4 F)	1-60 degrees	Defines the difference between the cut-in and cut-out temperatures.
Upper Set Point	10 C (50 F)	—	Upper range of user-adjustable set point.
Lower Set Point	3.3 C (38 F)	—	Lower range of user-adjustable set point.
Evaporator Offset	1.1 C (2 F)		
Lock Set Point Adjustment	Unlocked	Unlocked, locked	Locks the set point C/F, and alarm high/alarm low against accidental changes.
Import Parameters	No USB drive	No USB, import parameters	Import parameters from a USB port.
Export Parameters	No USB drive	No USB, export parameters	Export parameters from a USB port.
Alarm Setup			
Alarm 1 Delay	1 minute	0-60 minutes	Alarm1 delay before sounding.
Alarm 1 Function	R1	No, R1, R2, disable	Defines the action when Alarm 1 is activated. None (No), Relay 1 (R1), Relay 2 (R2), Display (disable).
Alarm 1 High Temp	49 C (120 F)	User Set Point to 250	High temperature to activate Alarm 1.
Alarm 1 Low Temp	-46 C (-50 F)	-50 - User Set Point	Low temperature to activate Alarm 1.

Parameter	Default Value	Range	Description
Alarm 1 Probe	Alarm (P4)	Control (P1), P4, P5	Probe for alarm 1.
Alarm 1 Reset	1	0-10	Temperature difference to reset alarm 1.
Alarm 2 Set up			
Alarm 2 Delay	1	0-60 minutes	Alarm 2 delay before sounding
Alarm 2 Function	Disable	No, R1 relay, R2 relay, Disable	Defines the action when alarm 2 is activated.
Alarm 2 High Temp	49 C (120 F)	User Set Point 250	High temperature to activate alarm 2.
Alarm 2 Low Temp	-46 C (-50 F)	-50 - User Set Point	Low temperature to activate alarm 2.
Alarm 2 Probe	Alarm (P4)	Control (P1), P4, P5	Probe for alarm 2.
Alarm 2 Reset	1 degrees	0-10 degrees	Temperature difference to reset alarm 2.
Alarm 3 Set up			
Alarm 3 Delay	1	0-60 minutes	Alarm3 delay before sounding
Alarm 3 Function	Disable	No, R1 relay, R2 relay, Disable	Defines the action when alarm 3 is activated.
Alarm 3 High Temp	49 C (120 F)	User Set Point 250	High temperature to activate alarm 3.
Alarm 3 Low Temp	-46 C (-50 F)	-50 - User Set Point	Low temperature to activate alarm 3.
Alarm 3 Probe	Alarm (P4)	Control (P1), P4, P5	Probe for Alarm 3.
Alarm 3 Reset	1 degrees	0-10 degrees	Temperature difference to reset alarm 3.
General Alarm Reset			
Alarm Ringback	10 minutes	0-120 minutes	Defines the time delay until the alarm will resound.
Alarm Remote Reset	No	On, I1, I2, I3, I4	Determines if the alarms can be silenced with a remote input from I1, I2, I3 or I4
Alarm Startup Delay	375 minutes	0-480 minutes	Defines the alarm delay during startup.
Alarm Silencing	Yes	Yes, No	Determines if the alarms can be silenced or not.
Maintain Alarm	Yes	Yes, No	Determines if the alarm(1-3) should be maintained if the temperatures fall back into range.
Door Control			
Door Open Alarm	Yes	Yes, No	Sound beeper when door alarm activated.
Door Open Alarm Delay	60 seconds	0-300 seconds	Door open alarm delay.
Door Open Relay	Disable	No, R1 relay, R2 relay, Disable	Alarm Relay to activate when door open alarm activated.
Door Fan control	Yes	Yes, No	Defines if the evap fan should shut off when the door is open.
Door compressor time	60 seconds	0-180 Seconds	Defines the time to shut off the compressor after the door is open. 0 = ignore
Light control			
Turn light on/off with door	Yes	Yes, No	Turn light on/off with door openings.
Light off timer	120 seconds	0-600 Seconds	Turn off the light after 120 seconds.
Power Alarm			
Power Alarm	Yes	Yes, No	Defines if an alarm should sound if power is lost.
Power Alarm Relay	Yes	Yes, No	Defines if relay should open/close on power alarm.
Power Alarm Timer	5 minutes	0-120 minutes	Delay before sounding the power alarm.

Parameter	Default Value	Range	Description
Battery Level			Battery Level
Data Storage	Yes	Yes, No	Overwrite circular data?
Data Full Alarm	No	Yes, No	Alarm when data memory is full?
Data log			
Sample Rate	5 minutes	0–360 minutes	minutes between data sampling. 0=Off
Data Duration			
Data Storage	Yes	Yes, No	Overwrite circular data?
Data Full Alarm	No	Yes, No	Alarm when data memory is full?
Track Events	Yes	Yes, No	Track events with log
P1 Datalog	No	Yes, No	Log P1 to event log
P4 Datalog	Yes	Yes, No	Log P4 to event log
P5 Datalog	No	Yes, No	Log P5 to event log
Defrost			
Manual Defrost	No	Yes, No	Force the unit into a defrost
Defrost Control	TPO	"Power on, manual only, disable, time of day, compressor on time"	Defines tactic for initiating a defrost
Graphing			
X Axis Range (hrs)	168 hours	1-384 hours	Time span for x-axis
Y Axis Minimum	–1 C (30 F)	–46 to 121 C (–50 to 250 F)	Minimum temperature shown on graph
Y Axis Maximum	27 C (80 F)	–46 to 121 C (–50 to 250 F)	Maximum temperature shown on graph
Graph Show Alerts	No	Yes, No	Determines whether alerts are displayed on the graph
P1 Graph Display	No	Yes, No	Determines whether to graph probe 1
P4 Graph Display	No	Yes, No	Determines whether to graph probe 4
P5 Graph Display	No	Yes, No	Determines whether to graph probe 5
Door Heater			
Door Heater	Yes	Yes, No	Controls door heater output
Door Heater Off (mins)	15	0–100	Off time for door heater if dht = on
Door Heater On (mins)	5	0–100	On time for door heater if dht = on
Error control			
Probe Error	BPr	NO, BPr, R1 relay, R2 relay	Action to take when probe error detected
Control On Time (mins)	2 minutes	0.0–120.0 minutes	Compressor on time when control probe error (minutes)
Control Off Time (mins)	6 minutes	0.0–120.0 minutes	Compressor off time when control probe error
Calibration			
Calibrate probes			Calibrate probes through a second menu
Viewable			
Cut In			View cut in temperature
Cut Out			View cut out temperature
Probe 1 temp			View temperature of probe 1
Probe 4 temp			View temperature of probe 4
Probe 5 temp			View temperature of probe 5

Parameter	Default Value	Range	Description
Power On Time (hrs)			View cumulative hours that the unit was in service
Compressor cycles			The number of compressor starts
Compressor run time(hrs)			View cumulative hours that the compressor was energized
Door open Cycles			The number of door opening
Door open time(hrs)			View cumulative hours that the door was open
Factory Reset			
Reset	No	No, Yes	Reset all parameters to factory reset

Chart recorder set up (if so equipped)

The chart recorder is mounted in the front right of the façade behind the door (**Fig. 26**). A package of 50 charts that record in C is included with your refrigerator. If you have changed your display to show temperatures in F, you will need different charts. Please call Follett at (877) 612-5086 or +1 (610) 523-9361 to order part number 00967729.

The chart recorder is powered by the controller and has its own battery back up. An LED provides battery status info: Steady green = battery okay, flashing green = low battery or no power to the controller.

Chart recorder calibration

If desired, calibration should be done at the same time as probe calibration by pressing either the left or right arrow keys to correspond with the calibrated product display temperature.

1. Press **Left #1** or **Right #2** arrow button for 5 seconds until pen begins to move.
2. Continue to press **#1** or **#2** button to move pen to record same temperature as probe.

Changing the chart paper

1. Press and hold **#3** button until pen begins to move off chart.
2. Once the pen moves completely off chart, unscrew knob (counter-clockwise) at center of chart.
3. Remove old chart and place new chart in position so that correct time coincides with time line groove on recorder.
4. Reinstall knob.
5. Press and hold **#3** button for approximately (1) one second until pen begins to move back onto chart.
6. Make sure pen is marking paper. If not, carefully adjust arm so that pen makes contact with paper.

Replacing the pen

1. To replace pen, press and hold the **#3** button until pen starts to move off chart.
2. Once pen has moved completely off chart, carefully lift pen up and unsnap the "U" clip part to remove pen from metal pen arm.
3. Position new pen on metal pen arm and snap "U" clip underneath pen around arm to secure.
4. Press and hold **#3** button for approximately (1) second until pen begins to move back onto chart.
5. Make sure pen is marking. If not, carefully adjust arm so that pen makes contact with paper.

Removing drawers

1. Pull drawer forward to stop (**Fig. 27.1**).
2. Lift drawer front to free front rollers from slides (**Fig. 27.2**).
3. Still lifted, pull drawer forward to free back rollers from slides.

Removing slides

1. Push slides all the way back.
2. Swing bottom of slide away from refrigerator wall and lift slide off rollers.

Fig. 26

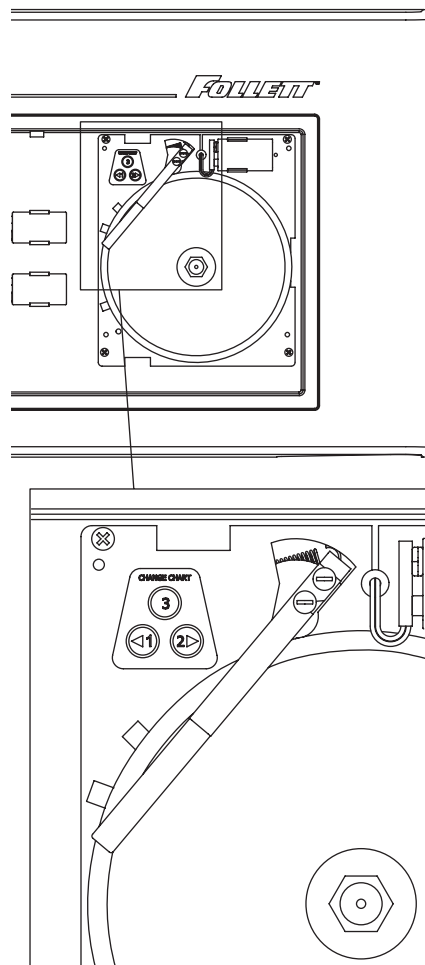
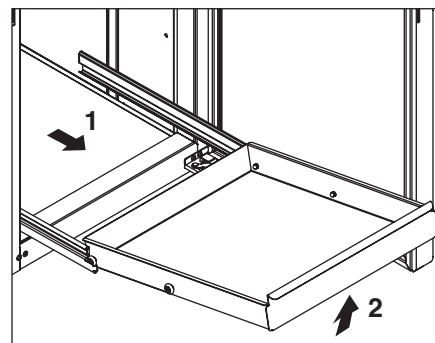


Fig. 27



Cleaning

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

Disconnect power to unit by turning the power switch off, located on the upper front façade panel, and removing the power cord from the receptacle.

Interior cleaning

Using a sponge or soft cloth, clean unit with a non-abrasive, non-chlorinated, all-purpose detergent. Note: The left and right air plenums should be removed to clean them, as well as behind them (**Fig. 28, 29**). In addition the shelves, baskets, drawers and slides should be cleaned as well.

Exterior cleaning

Wipe stainless steel 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. The glass door and exterior parts may be cleaned with a soft cloth, window cleaner or other non-abrasive cleaner.

Fig. 28

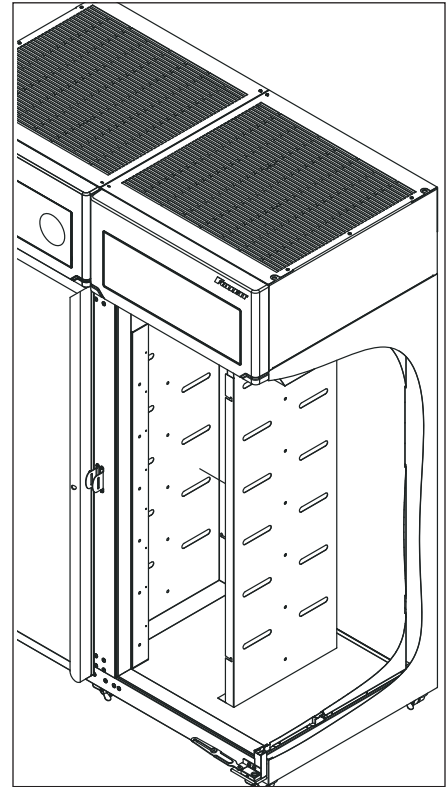
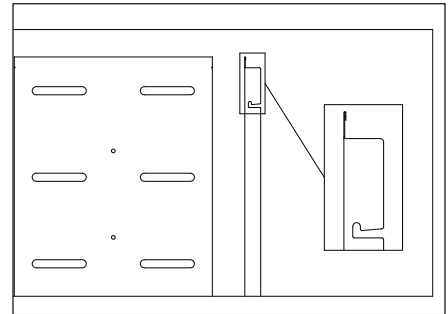


Fig. 29

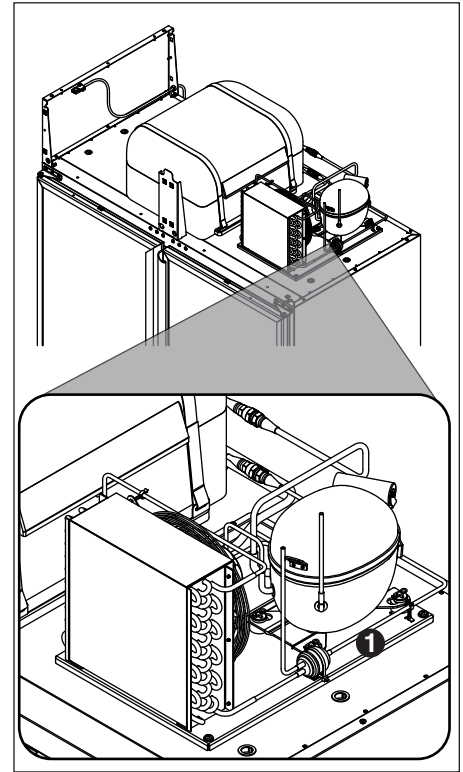


Annual cleaning

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

1. Disconnect power to unit by turning power switch off (located on upper front façade panel) and removing power cord from receptacle.
2. The condenser can be accessed from the top for cleaning. The side panel in front of the condenser may be completely removed for easier cleaning by disconnecting the façade and removing the upper side panel. See Face Removal for façade removal instructions.
3. Inspect drain pan for any debris or obstruction in condensate pan (**Fig. 30.1**).
4. Use a vacuum cleaner with brush attachment to clean condenser, compressor and related parts.
5. Reinstall upper side panel and façade if removed.

Fig. 30



Refrigeration System

The REF45 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 metering device and is critically charged. Access fittings are not provided. Temporary piercing valves are required to work on the refrigeration system. Follett recommends that if hoses are ever connected to the refrigeration system for service, the refrigerant should be recovered, permanent access valves should be installed and the system evacuated, and recharged by weighing in the correct refrigerant charge (refrigerant R134a, 13 oz (369 g)).

Note: Do not charge the system by pressures.

Defrosting

REF45 series refrigerators do not require manual defrosting. The evaporator coil defrosts automatically during the cooling system OFF cycle and also during the off time defrost cycle every 8 hours. The automatic defrost will terminate when the evaporator temperature, read off the P1 control probe, reaches 41 F (5 C).

Service - System Controls

The temperature controller and evaporator probe (P1-control) indicate when the refrigeration system is required to turn on and off.

The refrigeration system removes heat from the cabinet and rejects it into the surrounding room air.

When the evaporator probe (P1-control) reaches its predetermined cut-in value (Advanced settings, Viewable), the probe signals the controller to turn on the refrigeration system. The controller sends a 12VDC signal to the normally open compressor relay. The relay then closes, energizing the compressor and condenser fan.

When evaporator probe (P1-control) reaches its predetermined cut-out value (Advanced Settings, Viewable), the controller interrupts the 12 VDC signal to the compressor relay, de-energizing the compressor and condenser fan. The evaporator fan runs continuously.

Controller Operation

The controller displays product temperature in degrees C (default) or F to 1 decimal point. The controller set point serves as your desired product temperature.

The controller is pre-programmed to deliver a 3.3 C (38 F) product temperature. The controller allows for the set point to be adjusted as low as 2 C (36 F) and as high as 10 C (50 F).

All set points operate with a 1.1 C (2 F) evaporator offset along with a 2.2 C (4 F) differential. The evaporator offset, in conjunction with the set point and differential, determine the cut-in and cut-out points of the cooling system. For instance, a refrigerator running at the default set point of 3.3 C (38 F) will have the cooling system cut-in at 4.4 C (40 F) and cut-out at 2.2 C (36 F) according to the P1 control probe located in the return air flow to the evaporator coil. Cut-in and Cut-out parameters are viewable in the Advanced Settings Menu.

Sensor Readings/Temperature Display

The Touchscreen is defaulted to display the P4-Top probe, which reads the solution temperature of your product simulation bottle. For ease of troubleshooting, the Touchscreen can be toggled to display the P1-control probe to view the refrigeration cycle. To toggle the display for your desired probe, Access Advanced Settings>Display Probe and select the desired probe.

Note: After service is complete it is recommended to restore the display to the P4-Top Probe.

Heated door (option)

Factory default for the heated door and fascia heater cycle is set to 10 minutes off and 10 minutes on.

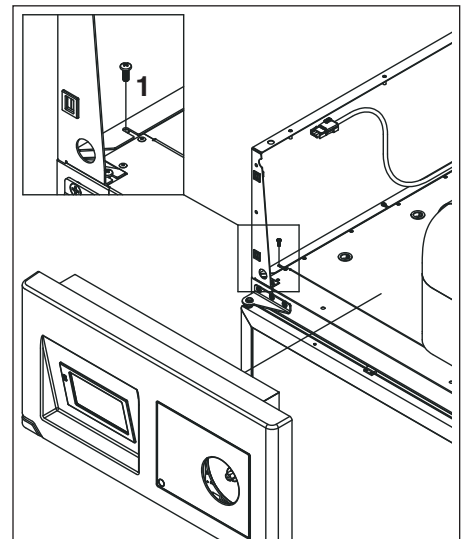
Should the need arise, the door schedule can be changed in Advanced Menu>Door Heater.

Façade removal

The façade is removed by loosening the top left and right Phillips screws on the back of the façade to allow the securing clips to rotate away from the side panels. The façade can simply pull off of the front by pulling it out of the bayonet mounts that secure it to the upper left and right panels. If the façade will be completely removed, the electrical plugs should be disconnected. The ground wire should be removed from the top left grounding screw on the cabinet box, not from the façade (**Fig. 31.1**).

Note: Be sure to reinstall the ground wire.

Fig. 31



Controller replacement

	⚠ CAUTION <i>The ontroller board is susceptible to electrostatic discharge. Extreme care should be exercised by using a grounding strap when handling and installing the control board.</i>
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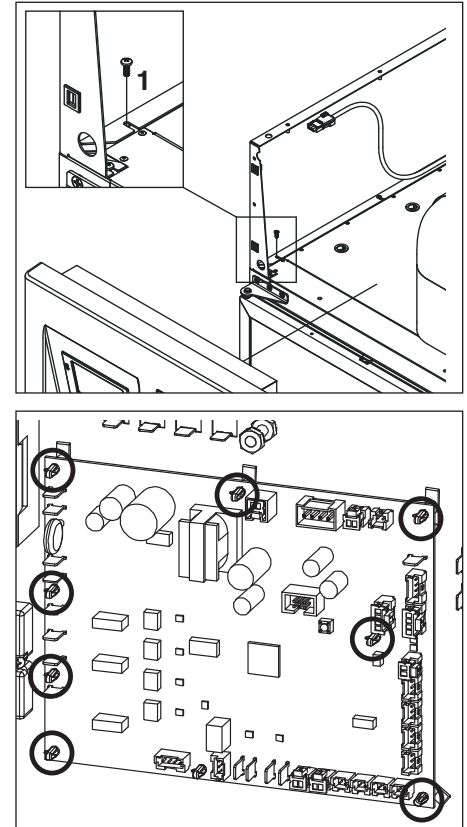
1. Turn off power to unit and unplug.
2. Disconnect electrical plugs and remove façade.
3. Remove screw securing ground screw to refrigerator cabinet (**Fig. 32.1**). Do not remove ground wire from façade.
4. Place façade face down on flat clean surface with bottom of façade facing you, and remove four screws attaching back panel to façade.
5. Lift and rotate back panel toward you.
6. Take precautions for proper grounding to reduce risk of electrostatic discharge (ESD) to the controller board.
7. Locate the control board standoffs (**Fig. 32.2**).
8. Using needle-nose pliers, pinch the stand-off tabs and gently pull up on the control board to release.

Note: All wiring should remain connected to the original control board at this time.

9. Install replacement control board on existing stand-offs.

Note: Use supplied stand-offs to replace any that may have been damaged during control board removal.

Fig. 32



10. Removing one at a time, transfer wiring from the original control board to the replacement control board, ensuring each wire is secured at the same location it was removed from.
11. Flip façade cover back into position on façade and reinstall 4 screws.
12. Remount façade to bayonet mounts.
13. Reconnect ground wire to grounding location on cabinet.
14. Reconnect all electrical and probe connections.
15. Plug in unit and power on, ensuring proper operation.

Reversing the door swing (requires a new door)

REF45 units ship standard with non-heated center opening doors. To change the configuration requires new doors.

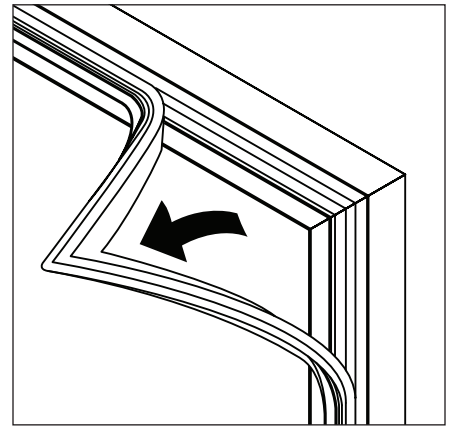
Heated doors

Heated doors are factory installed. A non-heated door cannot be retrofitted to a heated door in the field.

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.

Fig. 33

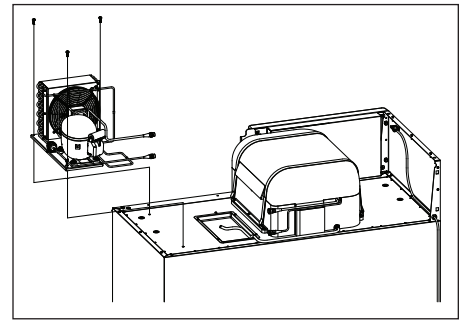


Replacement high-side assembly

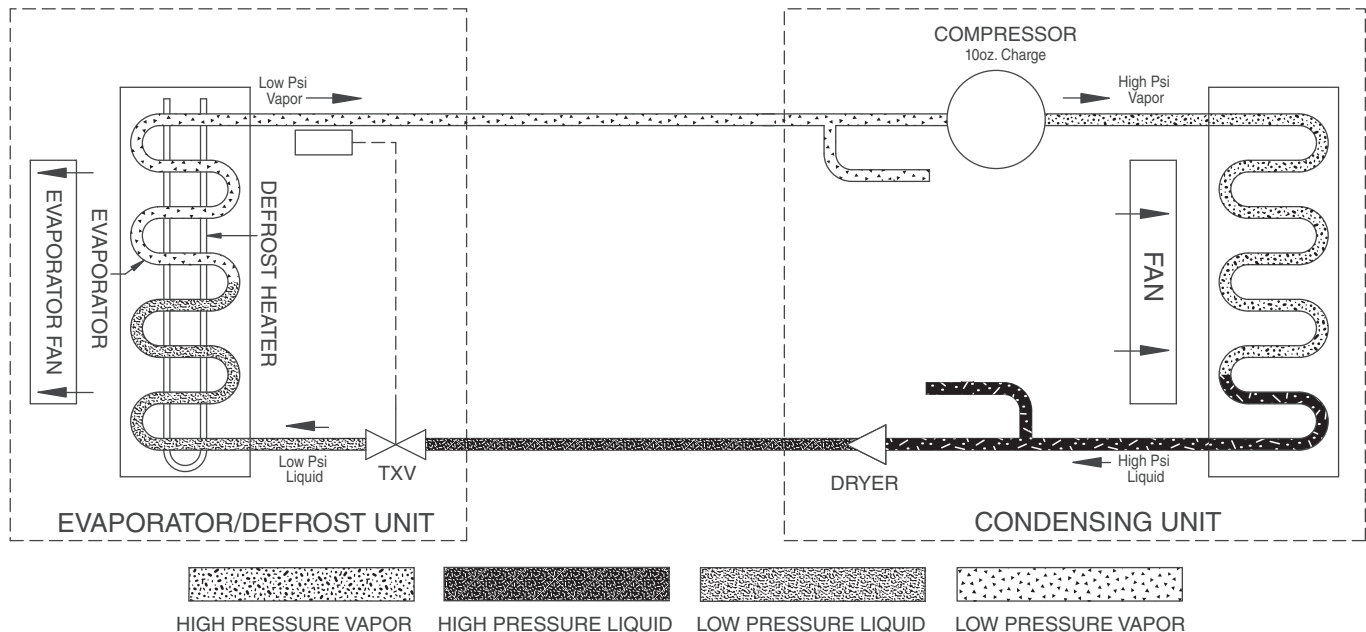
Follett's high-side condensing unit allows technicians to remove the entire high-side of the cooling system for easy repair/replacement.

1. Power down the unit and unplug the back-up battery.
2. If necessary, remove façade and upper side panels.
3. Disconnect suction/discharge quick-connect fittings.
4. Remove 3 bolts securing high-side assembly to refrigerator top.
5. Gently lift off high-side assembly.

Fig. 34



Refrigeration system



Component Details

Compressor

Running amps: 8.1A at 80 F 60% relative humidity
Locked rotor amps: 44 LRA (Copeland RRT62C1E compressor)
Cold winding resistance: S to C (4.6 Ω)
Cold winding resistance: S to R (5.3 Ω)
Cold winding resistance: C to R (0.8 Ω)

Condenser Fan

Running amps: 0.6A
Locked rotor amps: 1.0A
Cold winding resistance: 25 Ω

Evaporator Fan

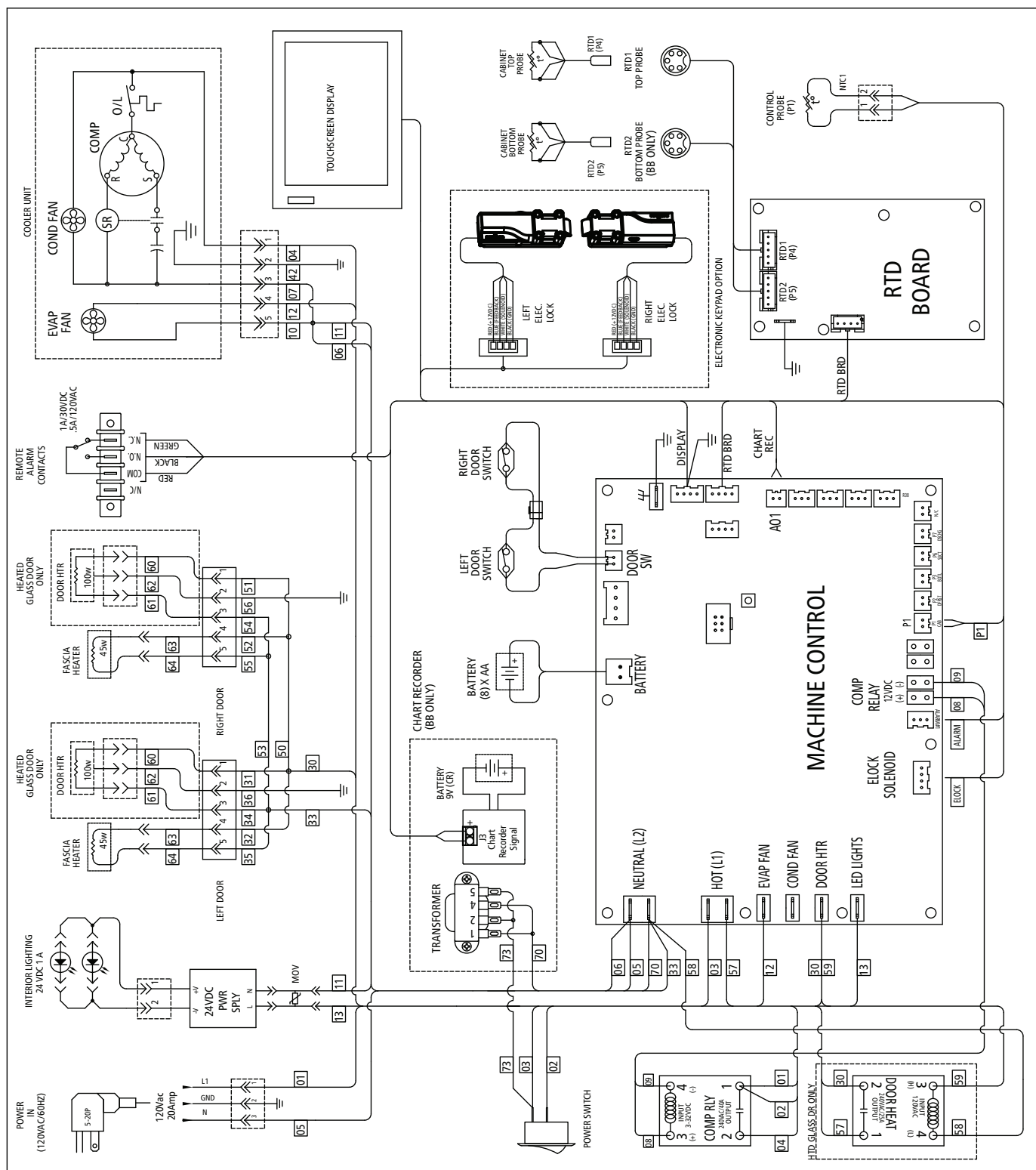
Running amps: 0.5A
Locked rotor amps: 1.7A
Cold winding resistance: 32 Ω

Refrigeration Pressure

Condenser inlet air temperature	75 F (24 C)
Discharge pressure (psig)	125-127
Suction pressure (psig)	13-16

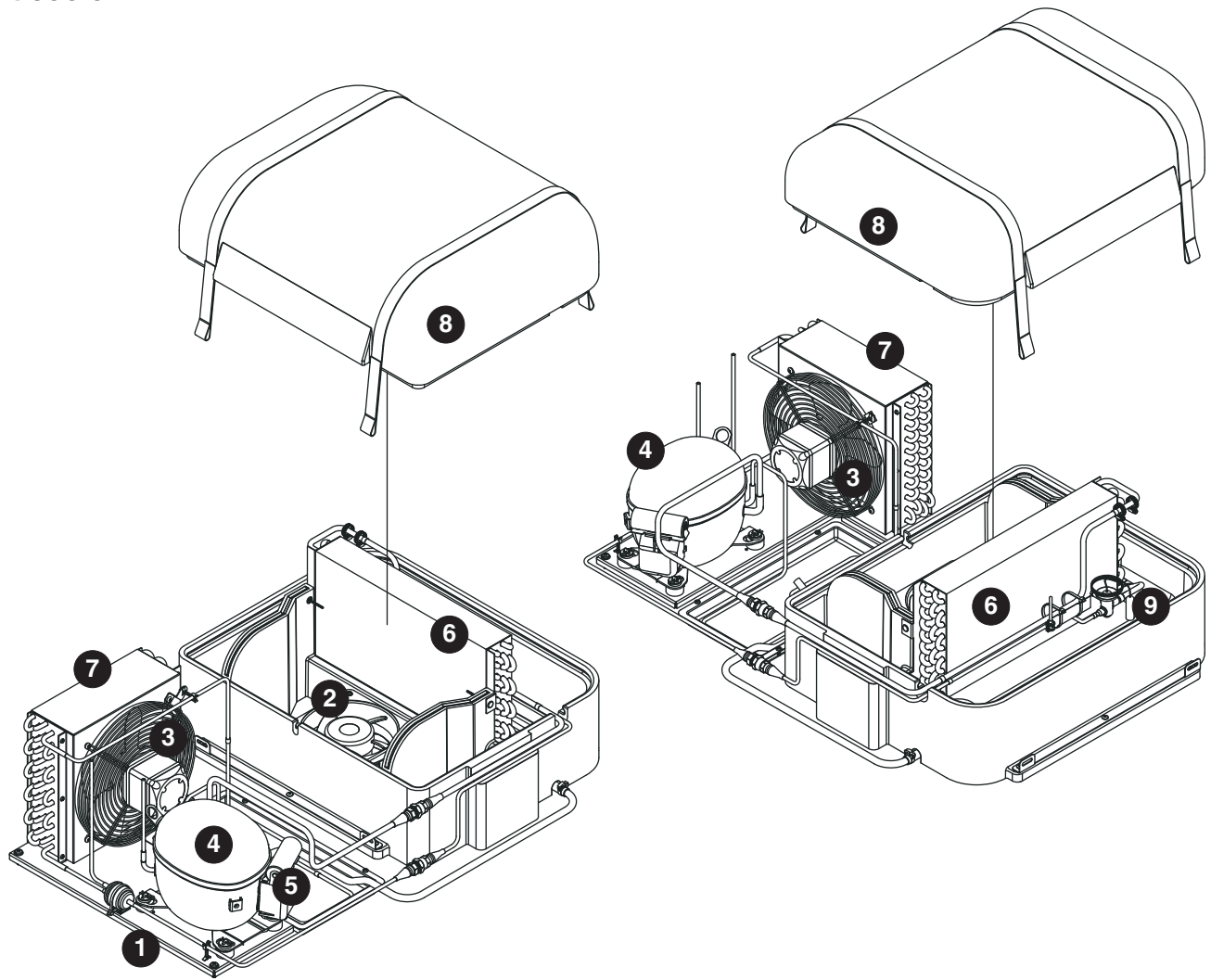
	70 (21)	80 (26.7)	90 (32.2)	100 (37.8)
Superheat	21	20	18	17
Subcooling	10	9	8	8

Wiring Schematic



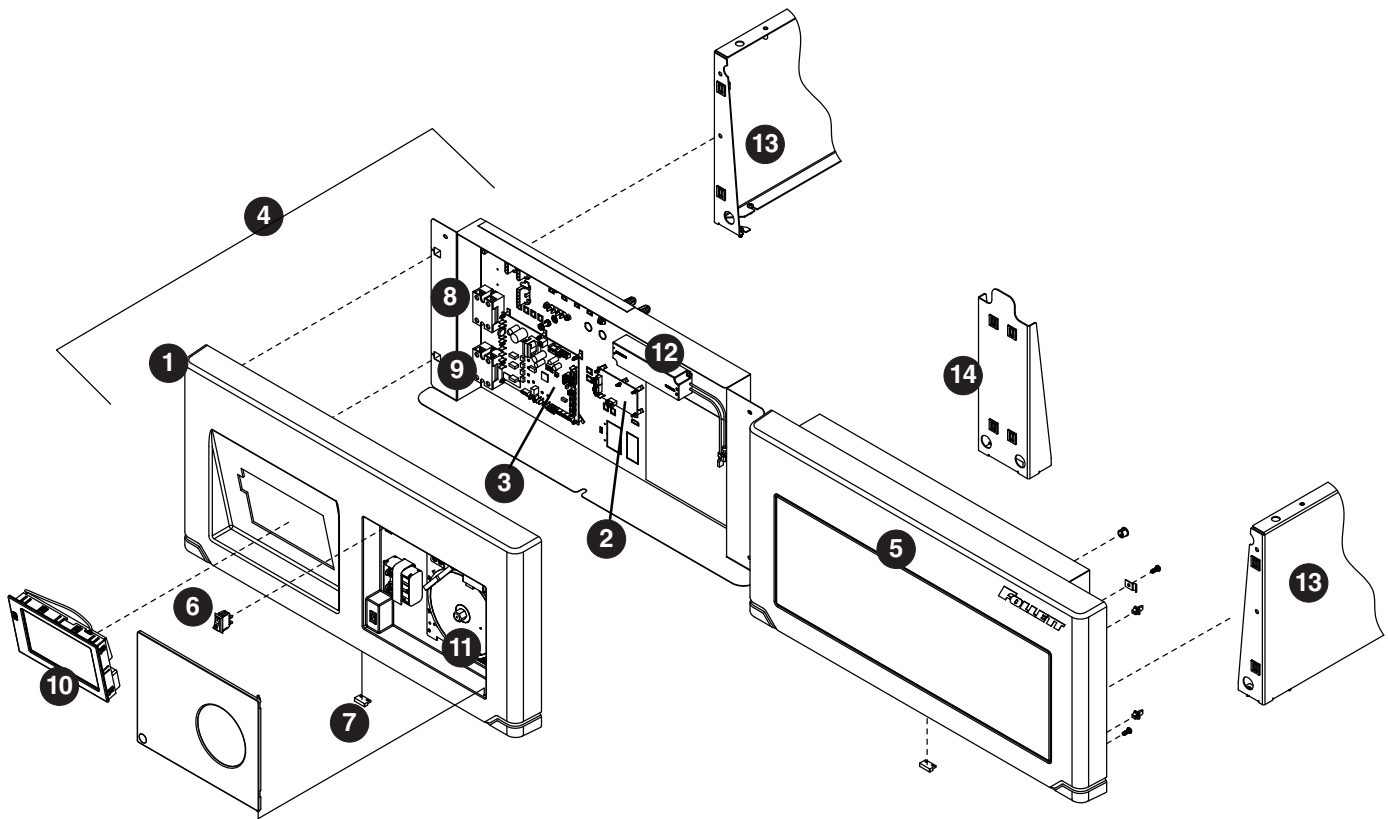
Replacement parts

Unit cooler



Reference	Description	Part #
1	Complete condensing unit	01147891
2	Evaporator fan	01164789
3	Condenser fan motor	01147909
Not shown	Condenser fan shroud	01147917
Not shown	Cap tube and drier	00945378
4	Compressor with start components and drier	01147867
5	Start components	01147875
Not shown	Filter drier	01147925
6	Evaporator coil with drier	01147933
7	Condenser coil with drier	01147883
8	Evaporator enclosure	01147941
Not shown	Enclosure straps	01164821
9	TXV	01157395
Not shown	Control probe	01062801

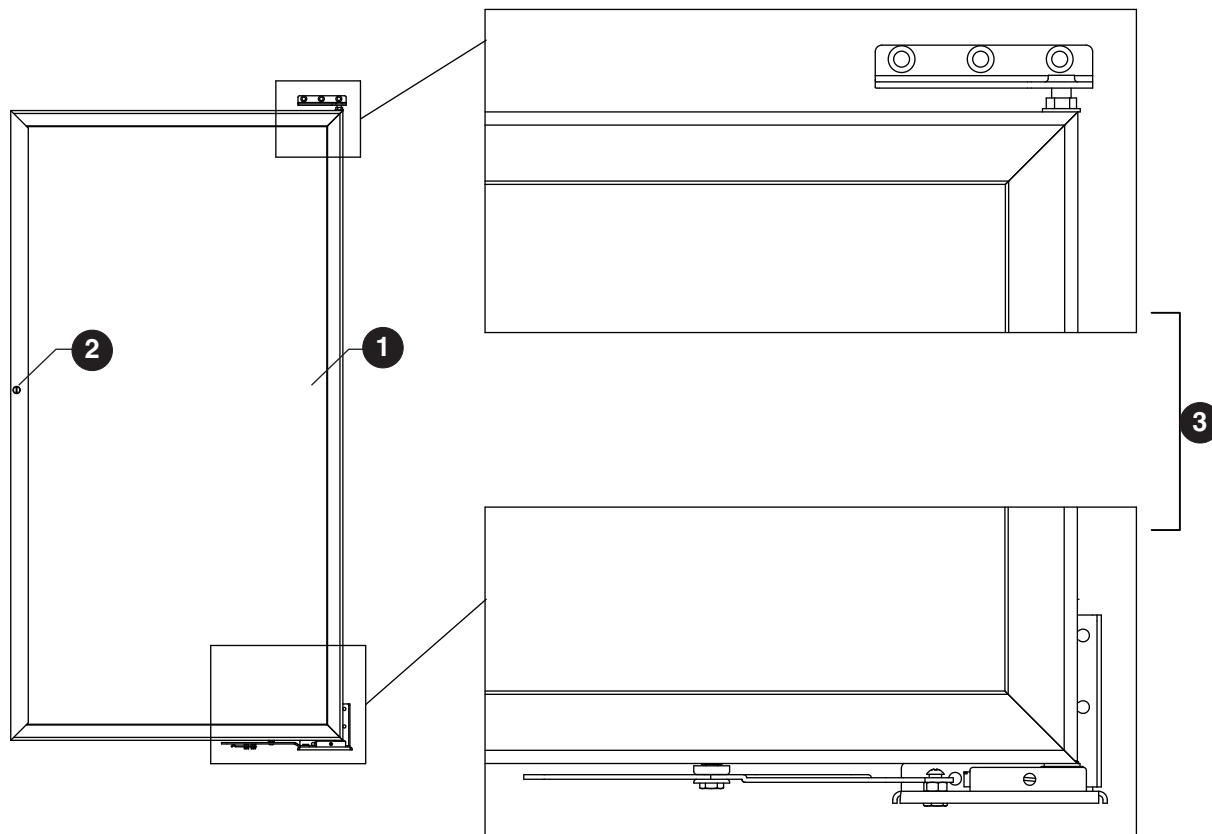
Façade



Reference	Description	Part #
1	Façade, cover, with chart recorder	01144062
1	Façade, cover, without chart recorder	01144054
2	RTD control board	01143965
3	Control board, without chart, without KP	01148048
3	Control board, without chart, with KP	01148055
4	Complete façade assembly, without KP, without chart recorder	01147966
4	Complete façade assembly, with KP, without chart recorder	01147974
4	Complete façade assembly, without KP, with chart recorder	01148006
4	Complete façade assembly, with KP, with chart recorder	01148014
Not shown	Alarm terminal assembly	01092022
5	Blank façade	01148170
6	Power switch	207360
7	Façade reed switch	01132091
8	Compressor relay	01132109
9	Door heater relay	00976852
10	Touchscreen	01124221
Not shown	Harness, control to touchscreen	01064856
Not shown	Electronic lock wiring harness	01026848
11	Chart recorder	00906198
Not shown	Chart recorder pens, box of 6	00918813
Not shown	Chart paper, degrees C (box of 50)	00918821
Not shown	Chart paper, degrees F (box of 50)	00967729
12	LED power supply	00939801

Reference	Description	Part #
Not shown	Bayonet, male	00179579
Not shown	Bayonet, female	00179556
Not shown	Façade locking clip	00931501
Not shown	Battery pack	01053222
Not shown	Battery pack wiring harness	01040278
Not shown	Batteries, AA, 4-pack	01053651
13	Shell, upper side	01148287
14	Shell, center	01164094
Not shown	Top ventilated cover	01148162
Not shown	Back support	01148154
Not shown	MOV assembly	01042258
Not shown	RTD probe harness, façade to control board	01106483
Not shown	NTC probe harness, façade to control board	01132075
Not shown	Latch fastener	00179556
Not shown	Cord and plug, kit	00996595

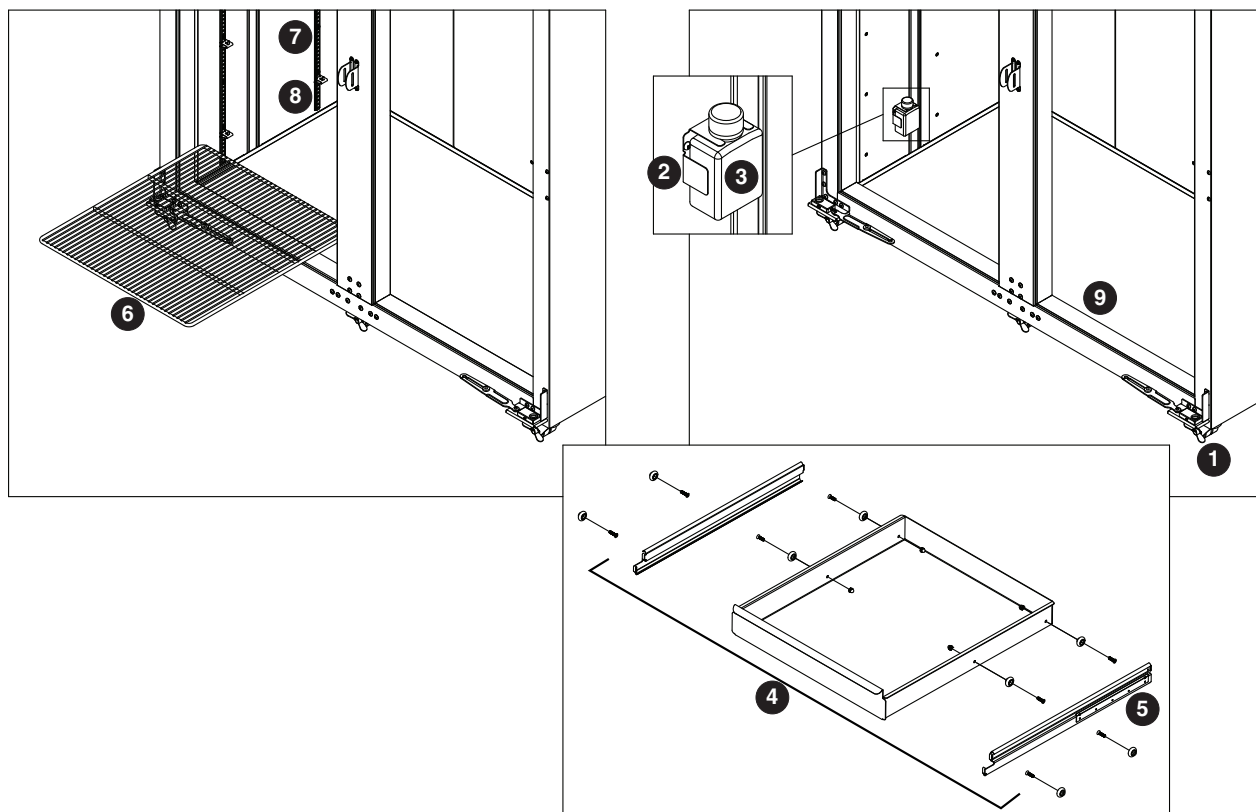
Door assembly



Reference	Description	Part #
1	Solid door, KP ready, RH with hinges	01152149
1	Solid door, KP ready, LH with hinges	01152131
1	Glass door, KP ready, non-heated, RH with hinges	01152099
1	Glass door, KP ready, non-heated, LH with hinges	01152081
1	Glass door, KP ready, heated, RH with hinges	01152115
1	Glass door, KP ready, heated, LH with hinges	01152107
1	Glass door, non-heated, left-hand hinge	00939876
1	Glass door, heated, left-hand hinge	00939991
1	Solid door, left-hand hinge	00996611
1	Glass door, non-heated, right-hand hinge	00939884
1	Glass door, heated, right-hand hinge	00940007
1	Solid door, right-hand hinge	00996603
Not shown	Key, glass door	00945436
Not shown	Door gasket, solid door	00960344
Not shown	Door gasket, glass door	00945345
2	Lock, glass door	00945444
Not shown	Key, solid door	01035013
2	Lock, solid door	00996629
Not shown	Lock bracket	00939983

Not shown	Door magnet kit	00939967
3	Right-hand hinges with hardware	00996579
3	Left-hand hinges with hardware	00996587
Not shown	Soft port kit	00940122
Not shown	Solid door handle	00996637
Not shown	Molded door handle cap, top	00989251
Not shown	Molded door handle cap, bottom	00989244
Not shown	Seismic anchoring wall bracket	00927194
Not shown	Pyxis bracket kit	00927202
Not shown	Omniceil bracket kit	00966432
Not shown	Electronic lock	01037571
Not shown	Electronic lock bracket with screws	01148139
Not shown	Electronic lock door bracket	01151547
Not shown	Electronic lock cover assembly	01148147
Not shown	KP ready solid door handle	01152065
Not shown	eLock cover, tamper-proof screws	01164235

Cabinet



Reference	Description	Part #
1	Caster, swivel with brake	00187674
2	Bracket, bottle, 125 ml	00171132
3	Bottle with gasket	01015817
4	Drawer, assembly, REF45	01164797
5	Slide, drawer, REF45 (set of 2)	01164805
Not shown	Basket, assembly, REF45	01164813
6	Shelf, REF45 (with supports)	01015841
7	Pilaster	00901173
Not shown	Pilaster, screws	00902213
8	Support, shelf	00156240
Not shown	Air panel	01157403
Not shown	Temperature probe, top/bottom	01089614
Not shown	Temperature probe, top/bottom, NIST calibrated	01140458
Not shown	Probe harness, façade to cabinet interior	01122282
9	Cover, thermal break (4 pieces)	00922997
Not shown	LED, light strip	00980912
Not shown	Glycerine (1 pint)	00959296
Not shown	LEDs (2), MOV and instructions	01049709

Warranty Registration and Equipment Evaluation

Thank you for purchasing Follett® equipment. We hope you find that our equipment meets or exceeds your expectations, as our goal is to deliver high value products and services that earn your complete satisfaction!

Please review the enclosed installation and operations manual. It is important that the installation be performed to factory specifications, so your equipment operates to its maximum efficiency.

Follett LLC will not be liable for any consequential damages, expenses, connecting or disconnecting charges or any losses resulting from a defect of the machine.

For full warranty details, visit our website www.follettice.com/productwarranties.

Warranty registration and equipment evaluation is important to help us keep track of our equipment and to record the machine's performance. We request that you register Follett equipment warranties on our website www.follettice.com/support and choose Warranty Registration and Equipment Evaluation. It's simple to do; please take a moment to register today. There is also space on the form to provide us with comments and feedback. Please let us know about your experience so we can capture it for our continuous improvement efforts.

We pride ourselves on producing outstanding equipment and we work hard to back it up with outstanding customer and technical support. Please let us know what else we can do to assist you. We would be happy to answer your questions.

Registro de Garantía y Evaluación del Equipo

Gracias por haber elegido este producto Follett®. Esperamos que nuestro equipo cumpla o supere sus expectativas porque es nuestro objetivo ofrecer productos y servicios de gran valor que se ganen su plena confianza.

Le rogamos consulte el manual de instalación y de instrucciones adjunto, ya que es muy importante que la instalación se realice según las especificaciones de fábrica para que el equipo funcione a su máxima eficiencia.

Follett LLC no se hace responsable de los daños indirectos, costos, gastos por conexión y desconexión o pérdidas por causa de defecto de la máquina.

Si desea una información más completa sobre la garantía, visite nuestro sitio web www.follettice.com/productwarranties.

Las operaciones de registro de la garantía y evaluación del equipo son importantes para que podamos realizar un seguimiento de nuestro equipo y registrar el rendimiento de la maquinaria. Por favor, registre las garantías del equipo Follett en nuestro sitio web www.follettice.com/support y seleccione Registro de la Garantía y Evaluación del Equipo. Es muy sencillo, solo le llevará un momento realizar hoy mismo el registro. En el formulario incluimos un espacio en blanco para sus comentarios y opiniones. Infórmenos sobre su experiencia para que podamos incorporarla a nuestros continuos esfuerzos de mejora.

Nos enorgullecemos de producir un equipo excepcional y trabajamos duro para respaldarlo con un soporte técnico y un servicio de atención al cliente de primera. Le rogamos nos indique qué más podemos hacer para ayudarlo. Estaremos encantados de responder a sus dudas.

Enregistrement de la garantie et évaluation de l'équipement

Merci d'avoir acheté un équipement Follett®. Notre objectif étant d'offrir des produits et des services de grande valeur vous satisfaisant pleinement, nous espérons que celui-ci satisfera, voire dépassera, vos attentes !

Veuillez consulter le manuel d'installation et d'exploitation. Il est important que l'installation soit réalisée conformément aux spécifications de l'usine, de sorte que votre équipement fonctionne à son rendement maximum.

Follett LLC n'est pas responsable de tout dommage consécutif, de toute dépense, de tout frais de raccordement ou de déconnexion, ni de toute perte liée à un défaut de la machine.

Pour lire la garantie dans son ensemble, visitez notre site Internet www.follettice.com/productwarranties.

L'enregistrement de la garantie et l'évaluation de l'équipement sont importants pour nous aider à suivre notre équipement et pour enregistrer les performances de la machine. Nous vous demandons donc d'enregistrer la garantie de votre équipement Follett sur notre site Internet, www.follettice.com/support, dans la section Warranty Registration and Equipment Evaluation. Cette opération est simple ; veuillez prendre un moment pour la réaliser aujourd'hui.

Le formulaire contient également un espace pour nous faire parvenir vos commentaires et un retour d'informations. Veuillez nous faire part de votre expérience pour que nous puissions prendre appui dessus pour poursuivre nos efforts constants d'amélioration.

Nous sommes fiers de produire des équipements exceptionnels et nous travaillons avec acharnement pour y associer une assistance à la clientèle et technique exceptionnelle. N'hésitez pas à nous indiquer dans quelle mesure nous pouvons vous aider. Nous serions ravis de répondre à vos questions.

