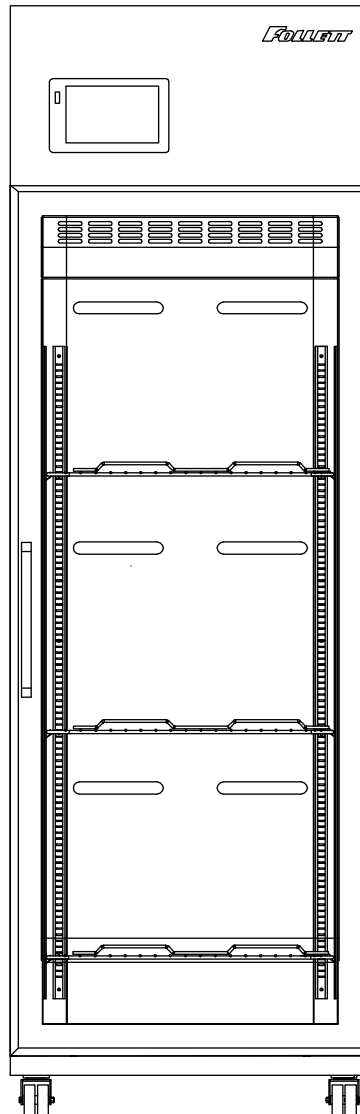


# Follett REF 12 – LB

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## Installation, Operation and Service Manual



**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 (877) 612-5086 or +1 (610) 252-7301.

## Before you begin

Do not tilt unit further than 30° off vertical during uncrating or installation. 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.

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 – <b>12</b>
					Configuration – <b>LB</b> (Laboratory - shelves)
					Door hinge – <b>R</b> (Right hand), <b>L</b> (Left hand)
					Keypad – <b>00</b> (Not available on this model)
					Door style – <b>S</b> (Solid stainless steel), <b>G</b> (Glass)

<b>REF</b>	<b>12</b>	<b>LB</b>	<b>R</b>	<b>00</b>	<b>S</b>
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Specifications			
	<b>REF12-LB-R00G</b>	<b>REF12-LB-L00G</b>	<b>REF12-LB-R00S</b>
Capacity	11.8 cu ft (334 L)	11.8 cu ft (334 L)	11.8 cu ft (334 L)
Storage system	(4) epoxy-coated shelves	(4) epoxy-coated shelves	(4) epoxy-coated shelves
Exterior width	23.62" (60 cm)	23.62" (60 cm)	23.62" (60 cm)
Exterior depth	25.38" (64.5 cm)	25.38" (64.5 cm)	25.38" (64.5 cm)
Exterior depth with handles	27.25" (69.2 cm)	27.25" (69.2 cm)	27.25" (69.2 cm)
Exterior height with casters	72.75" (185 cm)	72.75" (185 cm)	72.75" (185 cm)
Interior dimensions (w x d x h)	19.5" x 18.2" x 51.5" (49.5 cm x 46.2 cm x 131 cm)	19.5" x 18.2" x 51.5" (49.5 cm x 46.2 cm x 131 cm)	19.5" x 18.2" x 51.5" (49.5 cm x 46.2 cm x 131 cm)
Crated weight	419 lb (190 kg)	419 lb (190 kg)	382 lb (173 kg)
Max. heat rejection	1604 BTU/hr (470 W)	1604 BTU/hr (470 W)	1604 BTU/hr (470 W)

Standard features – all models	
Door	Dual pane, low-E glass, condensation free to 80 F (27 C) air/60% RH
Door handle	ADA-compliant. Glass door: towel-bar style; Solid door: recessed.
Interior/exterior material	Heavy-duty, corrosion resistant stainless steel
Casters	(4) dual-wheel swiveling casters with toe locks on front (2) casters
Insulation	2" (5 cm) thick, CFC/HFC-free foam insulation throughout
Lighting	Glass door: full length LED light in door on handle side; Solid door: overhead cabinet light
Air circulation system	Ducted air through 6 back plenum openings with front face return
Temperature probe	Platinum RTD (resistance temperature device)

## Ambients

Intended for indoor use where ambient temperature, measured at the condenser inlet, does not exceed 80 F (27 C) and ambient relative humidity does not exceed 60% RH.

## Clearances

The top of the refrigerator must have 20 inches (50.8 cm) of clear space above the refrigerator to ensure proper ventilation of the refrigeration system.

The back of the refrigerator should have 3 inches (7.6 cm) of clearance to allow for power cord clearance and ventilation on unit.

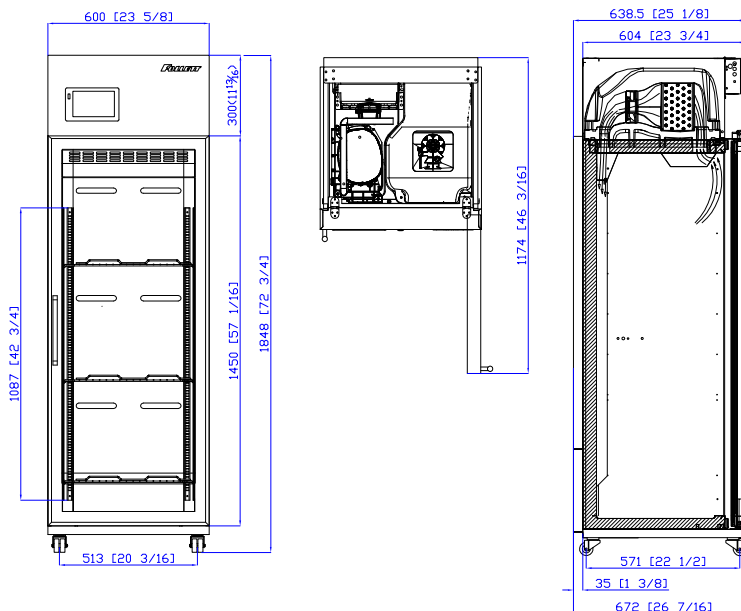
## Electrical specifications

- 115 V, 60 Hz, 1 phase
- Running load amps: 4 RLA
- Minimum circuit ampacity: 15A dedicated circuit
- Maximum size of branch circuit overcurrent device: 15A dedicated circuit
- Follett recommends circuit be protected by GFCI

## Refrigeration specifications

- Refrigerant R134a, 5.5 oz

## 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.**

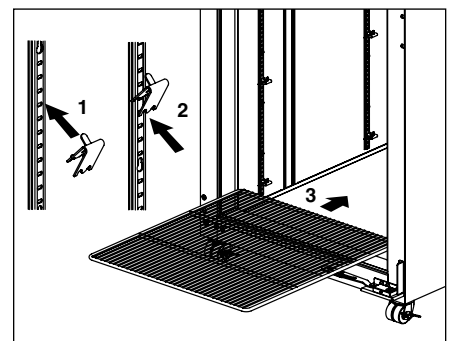
The equipment must be transported and handled exclusively in upright position, in observance of the instructions printed on the packing. This precaution is necessary to avoid contamination of the refrigerant circuit with compressor lube oil with resulting valve and heat exchanger coil failure and problems starting the electric motor or the risk of gas leak. The manufacturer is not responsible for any problems due to transport executed in conditions other than those specified herewith. The equipment is secured to a wooden pallet base, wrapped in a plastic film and packaged into a three waves carton box. The equipment must be handled using a fork lift truck or a pallet truck with suitable forks (fork length at least equal to 2/3 length of unit).

1. Remove packing material.
2. Remove accessories from inside the unit.
3. Carefully slide the cabinet off the skid.
4. Use gloves when handling the carton box or the wooden base to protect the hands from splinters.
5. Position the equipment with the help of a level. Remove the protective PVC film from the external surfaces of the unit.

### 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. 1**).
2. Plug refrigerator into a 115 V 60 Hz 15A dedicated outlet.

Fig. 1



## Fill product bottle

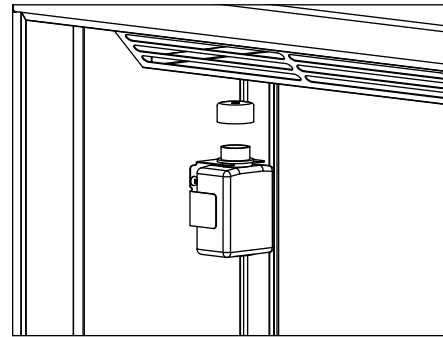
1. Remove probe and cap from the top bottle and fill with glycerine (e.g., 50% glycerine and 50% water) (**Fig. 2**). Replace cap and reinsert probe sensor.

### **ATTENTION INSTALLER**

***It is imperative that the probe bottle be filled with a solution that your facility uses to ensure proper operation of unit.***

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

**Fig. 2**



## Power the Unit

1. Plug in unit and press power button located on rear, right-hand corner. Press lower left corner of front facade door to access power switch inside.

## 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	System Status	Functions and Settings
 Settings	 Compressor is running	 USB download available (downloading when blinking)
 Alarming	 Evaporator fan is running	 Refrigeration set points
 Light	 Door is open	 Sleep functions
 Information log	 Defrost cycle is in process	 Centigrade to Fahrenheit
 Help		 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.




## 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 temperatures

Touch the temperature display a second time and the reset function  will appear under the high and 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.

Fig. 3



Fig. 4



Fig. 5



Fig. 6



## Help




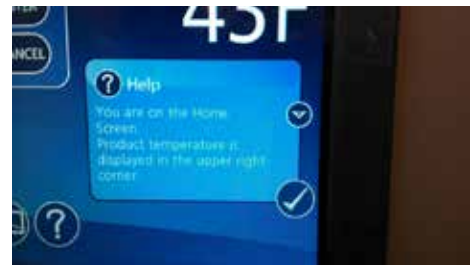
- Help is available at any time by touching the  icon at the bottom of the screen.
- Help is screen-specific; touching the  icon will display an explanation of the functionality and use of the screen you are currently viewing.
- Touch  to exit help screen.

Fig. 7



## Settings











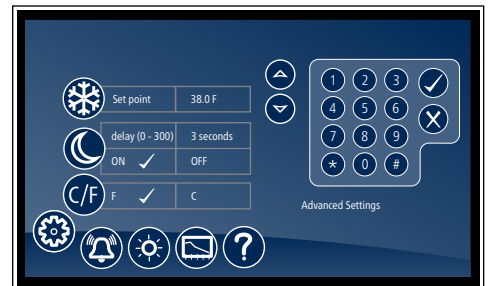
- Refrigeration Set Point 
  - Touch the number displayed in the box to the right of the Set point label and use the keypad or **UP** and **DOWN** arrows to select product temperature. Press  to accept or  to cancel.
- Sleep Temperature Display 
  - Toggle **ON** to hide the temperature reading immediately 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.

Fig. 8



Fig. 9



## 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. 10





### 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/Alarm

- The equipment utilizes a normally open switch to sense when the door is open/closed. When the door is closed the switch is in the closed position which allows for normal cooling system operation. When the switch is in the OPEN position, the door lights turn ON and the evaporator fan de-energizes but the compressor continues to run. Once the door switch returns to the closed position the evaporator fan will be re-energized. In the event that the door switch remains open for longer than 60 seconds, the compressor will also de-energize to avoid an unnecessary ice up of the evaporator coil due to lack of airflow. 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 120 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. 11

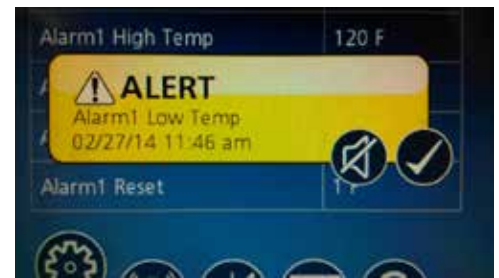
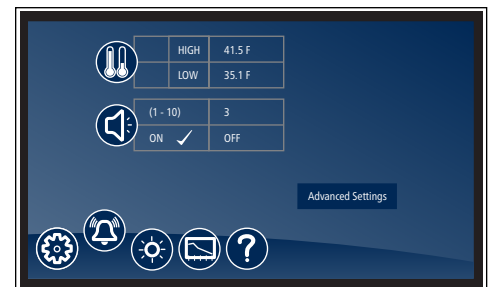


Fig. 12



## 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 facade. Touchscreen units utilize Alarm 1. 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.

## 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. Confirm with Check mark
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) 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.

Fig. 13

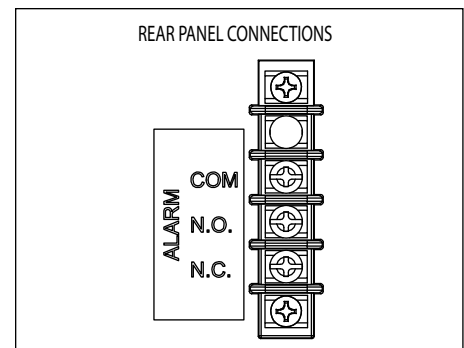
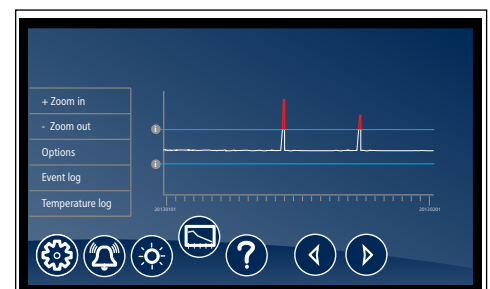


Fig. 14



## 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 (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.

- 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. 15



- 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. 16



### 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 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 Performance Plus unit. Download data reminder can be found in the advanced setting under **Data duration** and can be set from **1 to 180 days**.

## 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. 17



Fig. 18



Fig. 19

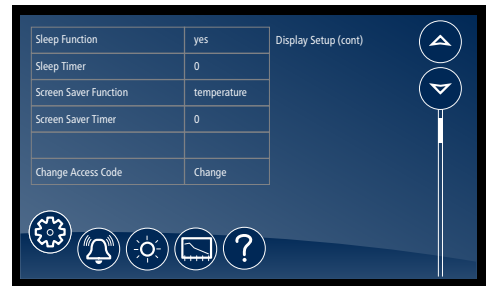












Fig. 20



## 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 1111).
- 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.

## Advanced Settings


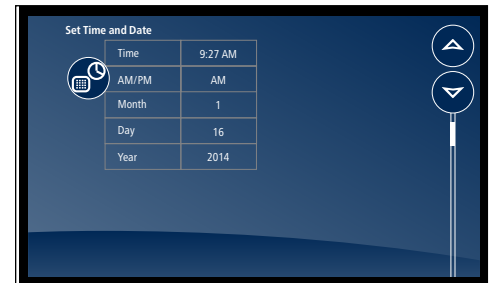
- Touch **Advanced Settings**, enter your 4-digit user access code in the keypad that appears, and touch the checkmark icon  to access advanced settings screens (factory default is 1111).

Fig. 21



## Advanced Setting - touchscreen

Parameter	Default Value	Range	Description
<b>Set Time and Date</b>			
Time	7:45	0 to 12	Holds Hour
AM/PM	AM	AM, PM	Holds AM/PM
Month	12	1 to 12	Month
Day	16	1 to 31	Day
Year	2013	2010 to 2099	Year
<b>System Information</b>			
Serial Number	19POP 0000	—	—
MC Version	63	—	MC version
EMC version	1	—	EMC version
UI version	48	—	UI version
Keypad version	2	—	Keypad version
<b>Display Setup</b>			
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 to 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), Defrost (P2), P4	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 to 600 seconds of non-use.
Sleep Timer	0 seconds	0 to 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 to 600 seconds	Amount of Time before the screen saver initiates.
<b>Control Setup (REF/FZR)</b>			
User Set Point	4.4 C (40 F)	LSP-USP	The temperature setpoint that the user adjusts.
Differential	3 C (5.4 F)	—	Defines the difference between the cut-in and cut-out temperatures.
Upper Setpoint	10 C (50 F) / -18 C (0 F)	—	Upper range of user-adjustable setpoint.
Lower Setpoint	2 C (36 F) / -37 C (-35 F)	—	Lower range of user-adjustable setpoint.
Lock Setpoint Adjustment	Unlocked	Unlocked, locked	Locks the setpoint C/F, and alarm high/alarm low against accidental changes.
Evaporator Offset	-1.1 C (-2 F)	—	Adds to set point to determine cut-in; used to adjust differences between displayed temperature and set point.
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.
<b>Alarm Setup</b>			
Alarm 1 Delay	1 minute	0 to 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.

Parameter	Default Value	Range	Description
Alarm 1 Low Temp	-46 C (-50 F)	-50 - User Set Point	Low temperature to activate Alarm 1.
Alarm 1 Probe	Alarm (P4)	Control (P1), P4, P5	Probe for Alarm 1.
Alarm 1 Reset	1	0 to 10	Temperature difference to reset Alarm 1.
<b>Alarm 2 Set up</b>			
Alarm2 Delay	1	0 to 60 minutes	Alarm 2 delay before sounding
Alarm2 Function	Disable	No, R1 relay, R2 relay, Disable	Defines the action when Alarm 2 is activated.
Alarm2 High Temp	49 C (120 F)	User Set Point 250	High temperature to activate Alarm 2.
Alarm2 Low Temp	-46 C (-50 F)	-50 - User Set Point	Low temperature to activate Alarm 2.
Alarm2 Probe	Alarm (P4)	Control (P1), P4	Probe for Alarm 2.
Alarm2 Reset	1 degrees	0 to 10 degrees	Temperature difference to reset Alarm 2.
<b>Alarm 3 Set up</b>			
Alarm3 Delay	1	0 to 60 minutes	Alarm3 delay before sounding
Alarm3 Function	Disable	No, R1 relay, R2 relay, Disable	Defines the action when Alarm 3 is activated.
Alarm3 High Temp	49 C (120 F)	User Set Point 250	High temperature to activate Alarm 3.
Alarm3 Low Temp	-46 C (-50 F)	-50 to User Set Point	Low temperature to activate Alarm 3.
Alarm3 Probe	Alarm (P4)	Control (P1), P4, P5	Probe for Alarm 3.
Alarm3 Reset	1 degrees	0 to 10 degrees	Temperature difference to reset Alarm 3.
<b>General Alarm Reset</b>			
Alarm Ringback	10 minutes	0 to 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	120 minutes	0 to 180 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 to 3) should be maintained if the temperatures fall back into range.
<b>Door Control</b>			
Door Open Alarm	Yes	Yes, No	Sound beeper when door alarm activated.
Door Open Alarm Delay	60 seconds	0 to 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 evaporator fan should shut off when the door is open.
Door compressor time	60 seconds	0 to 180 Seconds	Defines the time to shut off the compressor after the door is open. 0 = ignore
<b>Light control</b>			
Turn light on/off with door	Yes	Yes, No	Turn light on/off with door openings.
Light off timer	120 seconds	0 to 600 Seconds	Turn off the light after XX seconds
<b>Power Alarm</b>			
Power Alarm	Yes	Yes, No	Defines if an alarm should sound if power is lost.

Parameter	Default Value	Range	Description
Power Alarm Relay	Yes	Yes, No	Defines if relay should open/close on power alarm.
Power Alarm Timer	5 minutes	0 to 120 minutes	Delay before sounding the power alarm.
Battery Level			Battery Level
Data Storage	Yes	Yes, No	Overwrite circular data?
Data Full Alarm	No	Yes, No	Alarm when data memory is full?
<b>Data log</b>			
Sample Rate	15 minutes	0 to 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
P2 Datalog	No	Yes, No	Log P2 to event log
P4 Datalog	Yes	Yes, No	Log P4 to event log
P5 Datalog	No	Yes, No	Log P5 to event log
<b>Defrost</b>			
Manual Defrost	No	Yes, No	Force the unit into a defrost
Defrost Control	Manual only	"Power on, manual only,disable, time of day, compressor on time"	Defines tactic for initiating a defrost
<b>Graphing</b>			
X Axis Range (hrs)	168 hours	1 to 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
P2 Graph Display	No	Yes, No	Determines whether to graph probe 2
P4 Graph Display	No	Yes, No	Determines whether to graph probe 4
P5 Graph Display	No	Yes, No	Determines whether to graph probe 5
<b>Door Heater</b>			
Door Heater	UR REF with Heated Glass Door: Yes All others: No	Yes, No	Controls door heater output
Door Heater Off (mins)	UR REF with Heated Glass door: 10	0 to 100	Off time for door heater if dht = on
Door Heater On (mins)	UR REF with Heater Glass door: 10	0 to 100	On time for door heater if dht = on



Parameter	Default Value	Range	Description
<b>Error control</b>			
Probe Error	BPr	NO, BPr, R1 relay, R2 relay	Action to take when probe error detected
Control On Time (mins)	UR REF: 8	0.0 to 120.0 minutes	Compressor on time when control probe error (minutes)
Control Off Time (mins)	UR REF: 15	0.0 to 120.0 minutes	Compressor off time when control probe error
<b>Calibration</b>			
Calibrate probes			Calibrate probes through a second menu
<b>Viewable</b>			
Cut In			View cut in temperature
Cut Out			View cut out temperature
Probe 1 temp			View temperature of probe 1
Probe 2 temp			View temperature of probe 2
Probe 4 temp			View temperature of probe 4
Probe 5 temp			View temperature of probe 5
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
<b>Factory Reset</b>			
Reset	No	No, Yes	Reset all parameters to factory reset

## 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 rear, right hand corner, and removing the power cord from the receptacle.

The appliance is designed for medications, vaccines and laboratory product storage so it is important to keep it clean. The equipment is thoroughly cleaned at the factory before being shipped. We recommend, however, to clean the interior cabinet before the first start up of the appliance.

### Interior cleaning

Using a sponge or soft cloth, clean unit with a non-abrasive, non-chlorinated, all-purpose detergent. Note: The air plenum can be removed to clean it, as well as behind it. In addition, the shelves 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.

### Annual cleaning

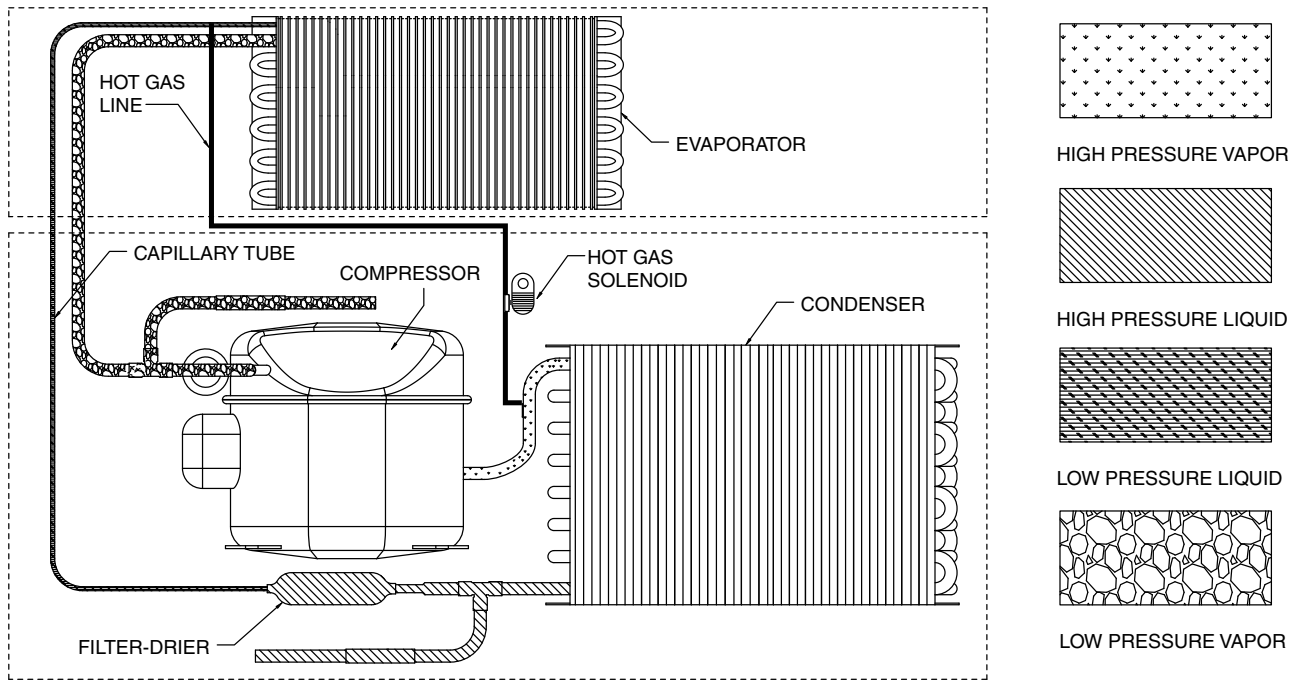
Removal of dust and other particulates from air intake areas and the condenser is important for proper operation. Environments with large amounts of dust may require more frequent cleaning.

1. Disconnect power to unit by turning power switch off and removing power cord from receptacle.
2. The condenser can be accessed from rear for cleaning.
3. Inspect drain pan for any debris or obstruction in condensate pan.
4. Use a vacuum cleaner with brush attachment to clean condenser, compressor and related parts.

## Refrigeration System

The REF12 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, 5.5 oz).

**Note: Do not charge the system by pressures.**



### Component Details

<b>Compressor amperage</b>	RLA - 2.9A, LRA - 29A
<b>Compressor winding resistances</b>	C-S (9.1Ω), C-R (2.0Ω)
<b>Evaporator fan motor amperage</b>	FLA - 0.18A
<b>Condenser fan motor amperage</b>	FLA - 0.4A

### Refrigeration Pressure

<b>Condenser inlet air temperature</b>	80 F (26.7 C)
<b>Discharge pressure (psi)</b>	145
<b>Suction pressure (psi)</b>	35

### Defrosting

This equipment utilizes a hot gas defrost cycle to keep the evaporator coil clear of ice. For every 10 hours of compressor run time the system will initiate a defrost.

When the defrost cycle is initiated both the evaporator fan and condenser fan cycle off while the compressor continues to run. The defrost solenoid opens to allow the hot compressor discharge vapor to bypass the condenser coil, instead directing it to the evaporator coil. When the evaporator coil temperature reaches 5 C (41 F), when read by the P2 defrost probe, the defrost solenoid closes and the compressor turns off. The system then enters a 60 second drip cycle. Upon completion, the compressor and condenser fan are re-energized and start to cool the evaporator coil. When the evaporator coil reaches -5 C (23 F), read by the P2-Defrost probe, the evaporator fan re-energizes and the cooling cycling begins.

## 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 12 Vdc 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 is preprogrammed with a default set point of 4.4 C (40 F). 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 (-2.0 F) evaporator offset along with a 3 C (5.4 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 unit running at the default set point of 4.4 C (40 F) will have the cooling system cut-in at 3.3 C (38 F) and cut-out at 0.3 C (32.6 F) according to the P1-Control probe located in the return air prior to the evaporator coil. Cut-in and cut-out parameters are Viewable in the Advanced settings menu.

This system is equipped with failsafe operating parameters in the event of a control probe failure. In the event of a P1-Control probe failure, the system will enter its default run cycle of 8 minutes ON, 15 minutes OFF and continue to cycle this way until the P1-Control probe is replaced.

### **ATTENTION**

***Cabinet temperature adjustments can be made by simply modifying the temperature control setpoint. Modifications to the factory default settings for the control differential or evaporator offset parameters will result in excessive compressor cycles that may lead to premature compressor/start component failures. Component failures caused by adjusting these critical control operating parameters may void the equipment warranty.***

## Sensor Readings/Temperature Display

The Touchscreen is defaulted to display the P4 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 probe.

## Facade removal



The facade is removed by loosening screws and the complete front panel can be rotated. If the facade will be completely removed, the electrical plugs should be disconnected.

**Note:** Be sure to reinstall the ground wire.

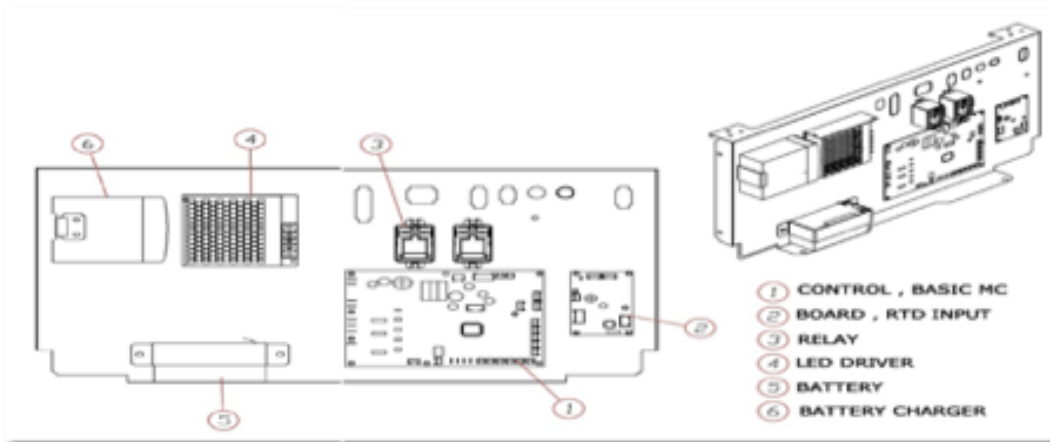
Fig. 22



## Controller replacement

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>• <b>Controller board is susceptible to electrostatic discharge. Extreme care should be exercised by using a grounding strap when handling and installing control board.</b></li></ul>

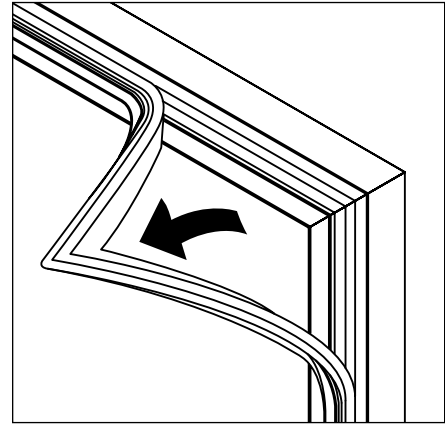
1. Turn off power to unit and unplug.
2. Disconnect electrical plugs and rotate facade.
3. Remove screw securing ground screw to refrigerator cabinet. Do not remove ground wire from facade.
4. Take precautions for proper grounding to reduce risk of electrostatic discharge (ESD) to the controller board.
5. Locate the control board stand-offs.
6. 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.
7. 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.
8. 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.
9. Remount façade.
10. Reconnect ground wire to grounding location on cabinet.
11. Reconnect all electrical and probe connections.
12. Plug in unit and power on, ensuring proper operation.



## Door gasket replacement

1. Remove existing gasket from mounting track (**Fig. 23**).
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. 23

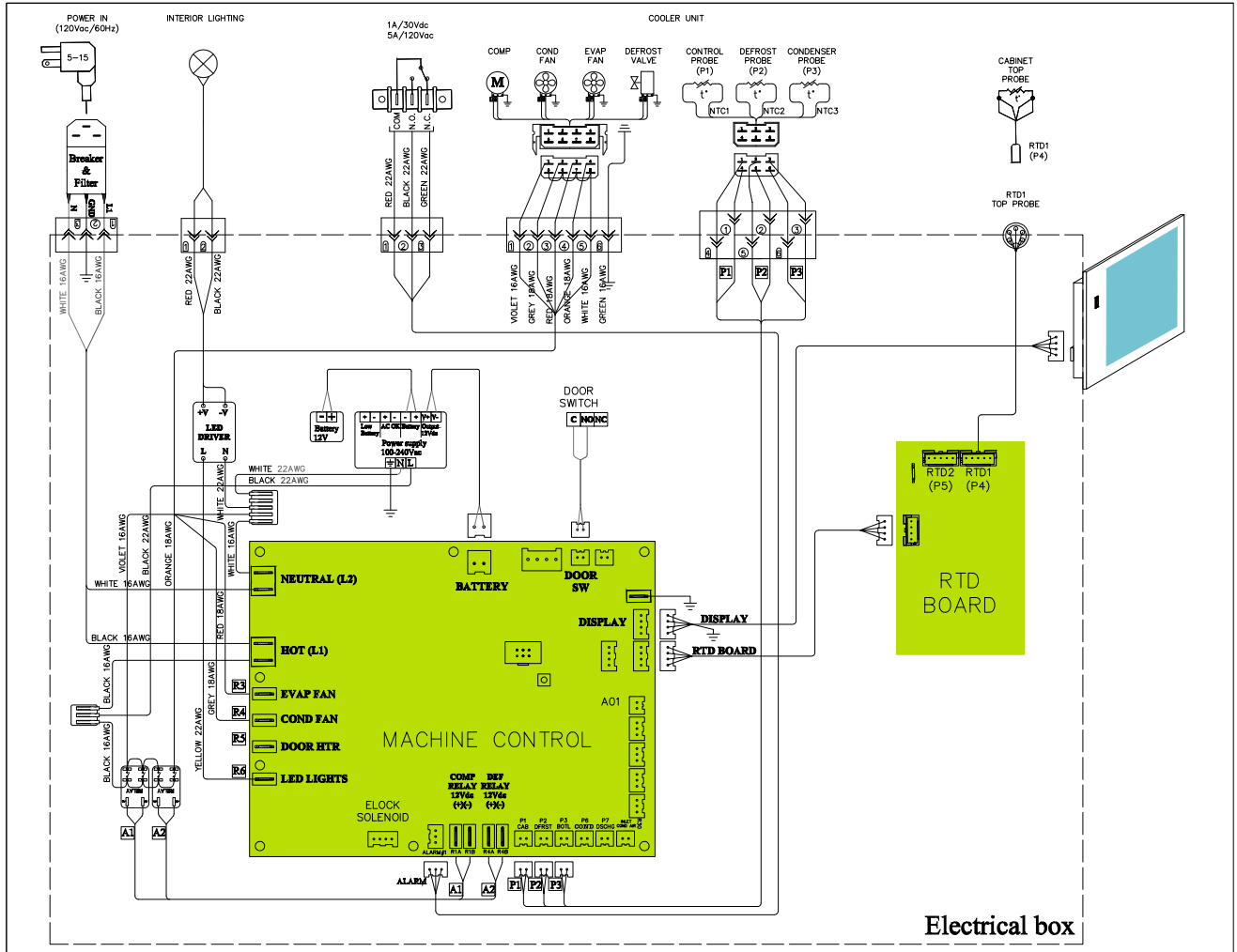


## Modular Refrigeration System

Follett's Modular Refrigeration System system allows technicians to remove the entire unit from the refrigerator top.

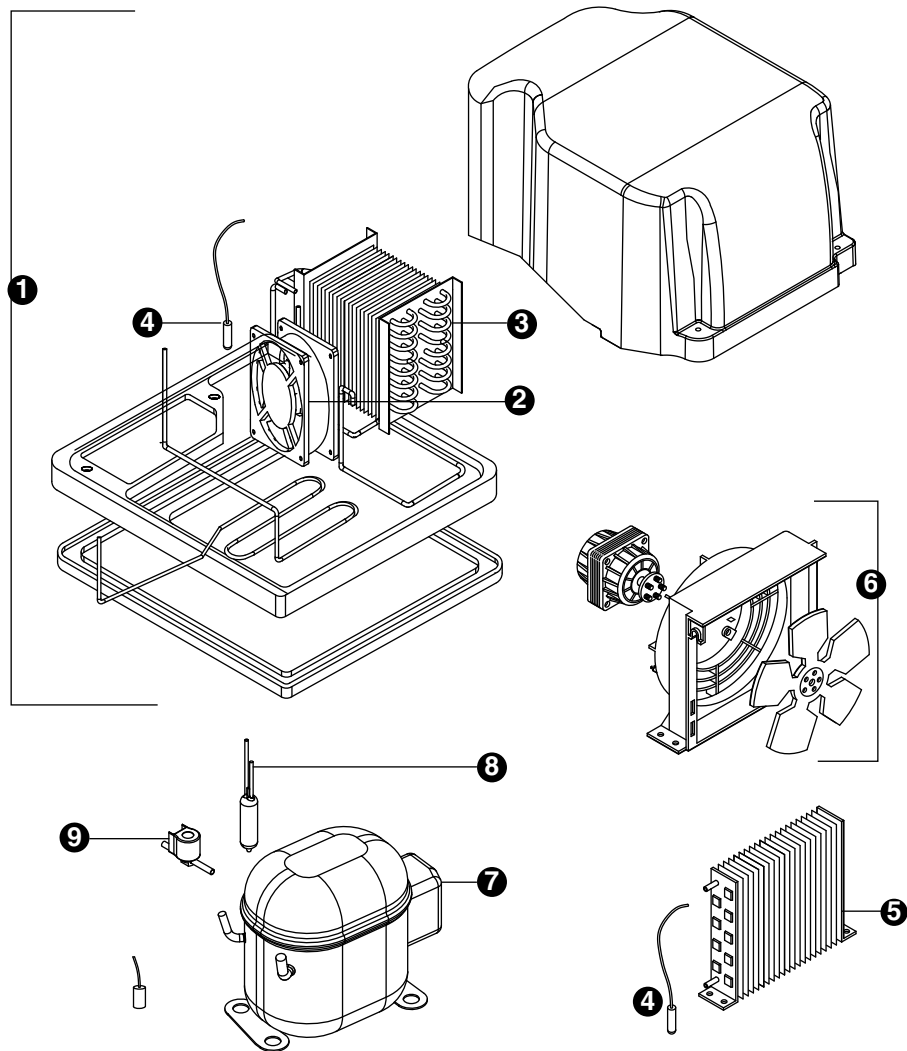
1. Remove rear support column using 5/16" nut driver.
2. Remove incoming power supply assembly.
3. Remove four bolts securing unit cooler to refrigerator top.
4. Gently lift off cooler.

# Wiring diagram



# Replacement parts

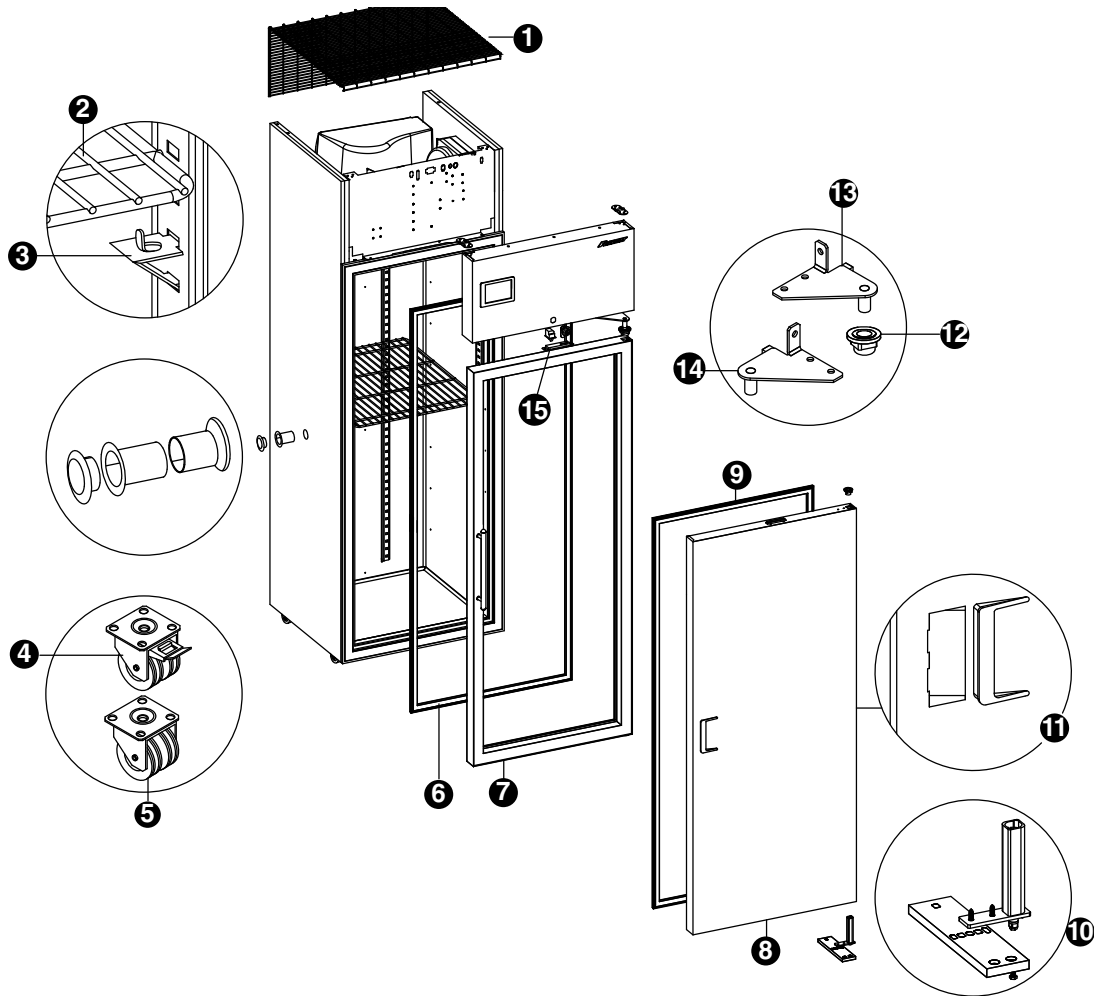
## Unit cooler



Reference	Description	Part #
1	Complete refrigeration system	01312529
2	Evaporator fan motor	01053818
3	Evaporator coil with drier	01311919
4	Temperature probe, control and defrost	01310564
5	Condenser coil with drier	01311901
6	Condenser fan motor	01311885
7	Compressor with start components and drier	01311943
8	Cap tube and filter drier	01311935
9	Defrost solenoid valve with coil	01311927
Not shown	Start components	01311950
Not shown	Power cord	01316140
Not shown	Power switch assembly	01316157
Not shown	Seismic wall bracket	01319441

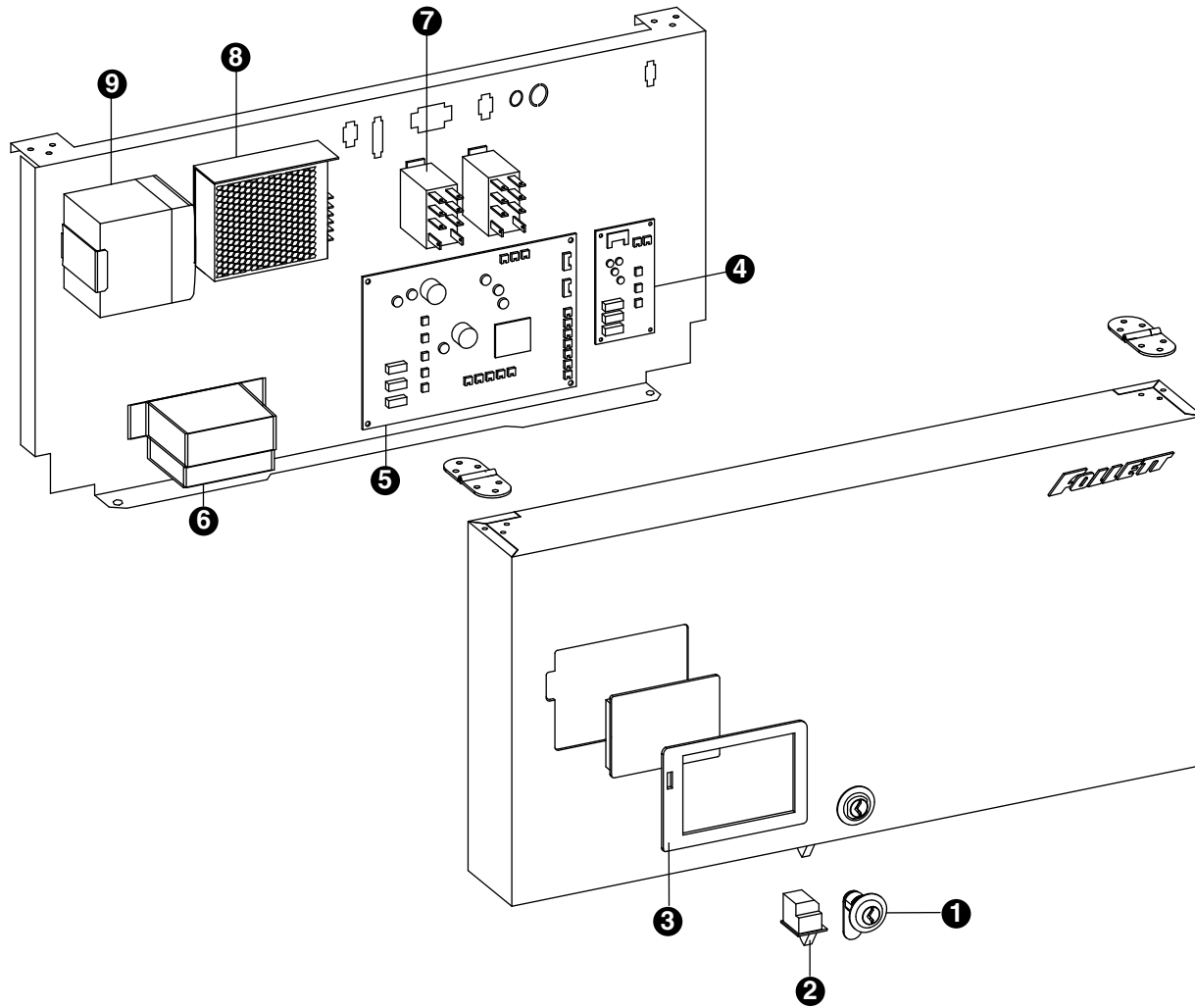


# Cabinet



Reference	Description	Part #
1	Top ventilation cover	01310523
2	Shelf with holder	01311976
3	Holder, shelf (4)	01310531
4	Front caster	01310556
5	Rear caster	01310606
6	Gasket for glass door (SN 21POP0558801 and prior)	01313113
6	Gasket for glass door (SN 21POP0558801 and after)	01536846
7	Glass door assembly, right hand and left hand (SN 21POP0558801 and prior)	01313089
7	Glass door assembly, right hand and left hand (SN 21POP0558801 and above)	01536820
8	Solid door, stainless steel, right-hand only (door only)	01313097
9	Gasket for solid door	01310614
Not shown	Hinge kit, right and left hand, (SN 21POP0558801 and after)	01536838
10	Spring kit, bottom hinge, solid door	01310580
10	Spring kit, bottom hinge, glass door (SN 21POP0558801 and prior)	01316132
11	Door handle, solid door	01310598
12	Upper hinge bushing (SN 21POP0558801 and prior)	01310549
13	Upper right hinge w/bushing, solid door	01310572
13	Upper right hinge w/bushing, glass door (SN 21POP0558801 and prior)	01316074
14	Upper left hinge w/bushing, glass door	01316058
15	Lock bracket with screws	01316124
Not shown	LED, solid door	01316090

# Facade



Reference	Description	Part #
1	Lock with keys	01394329
2	Door switch	01311968
3	Touchscreen	01124221
4	RTD board	01143965
5	Control board with standoff	01311984
6	Rechargeable battery, battery backup	01312503
7	Relay, compressor/defrost	01312560
8	LED driver, glass door only	01316108
9	Battery charger	01316041
Not shown	Temperature probe, bottle	01089614
Not shown	Harness, control to touchscreen	01064856
Not shown	Probe harness, facade to cabinet interior	01122282
Not shown	RTD probe harness, facade to control board	01106483
Not shown	Harness, control/defrost probe, facade	01312537
Not shown	Door switch harness	01312537
Not shown	Harness, main board to RTD board	01026780



## 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](http://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](http://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](http://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](http://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 !

Veillez 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](http://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](http://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.