LENNOX **VRF**

LVM
Touch Screen Centralized Controller

THIS MANUAL MUST BE LEFT WITH THE OWNER FOR FUTURE REFERENCE

Equipment List

A complete LVM system consists of:

1 - Touch Screen Centralized Controller
    V0CTRL15 (15" screen)
1 - LVM Hardware - V0CTRL85P-3
1 - LVM Software (factory installed)
1 - LVM Software key dongle
1 - Router switch, wireless or wired (not included)

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⚠WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.
Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or service agency.

IMPORTANT!

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation. Read all of the information in this manual before operating this equipment.

General

The V0CTRL85P-3 Lennox VRF Manager (LVM) touch screen centralized control system can monitor and control up to 320 VRB & VPB VRF systems with up to 960 VRF outdoor units and 2560 VRF indoor units. See Appendix A.

The system consists of one touch screen centralized controller connected with a minimum of one, maximum of four, LVM hardware devices.

A field-supplied router switch and communication wiring is required.

**Lennox VRF Outdoor and Indoor Units**
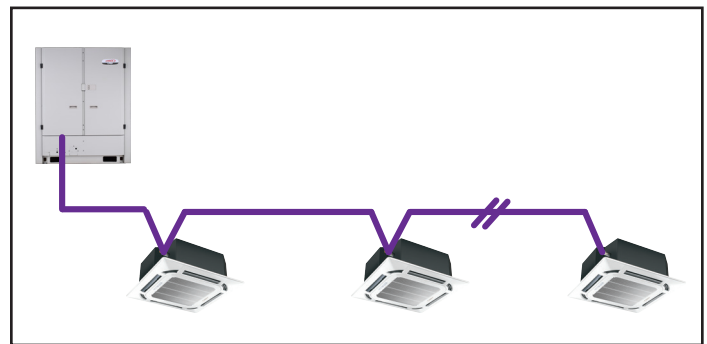
Figure 1. VRF System Example

All Lennox VRF P3 outdoor and indoor units can be connected to the V0CTRL85P-3LVM system. The outdoor and indoor units will provide cooling and heating to the building at the direction of the LVM. Refer to the individual unit's manuals for information about that specific unit.
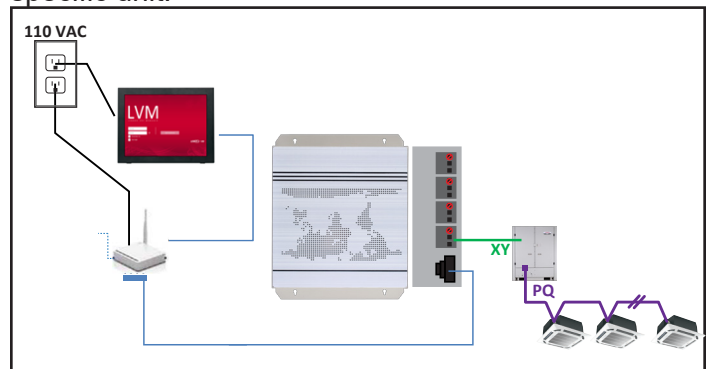
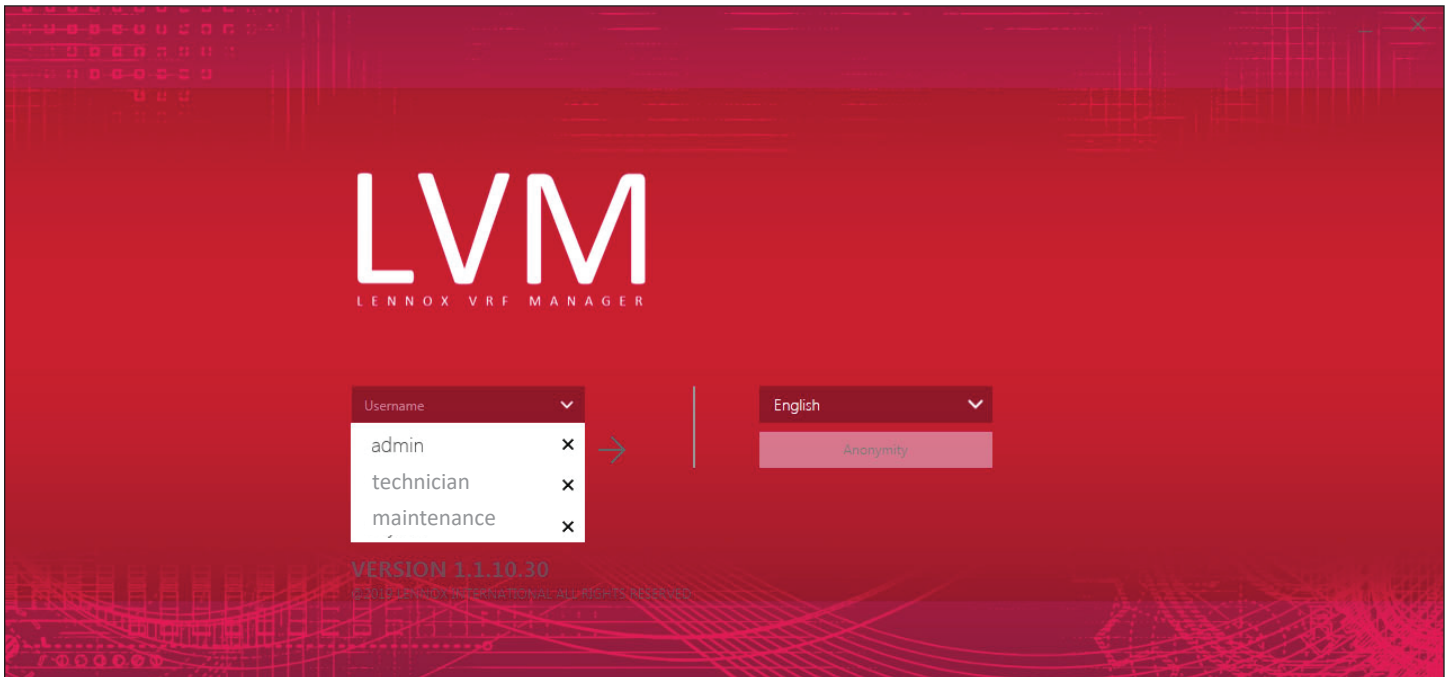**Figure 2. One VRF System Single Module Example**
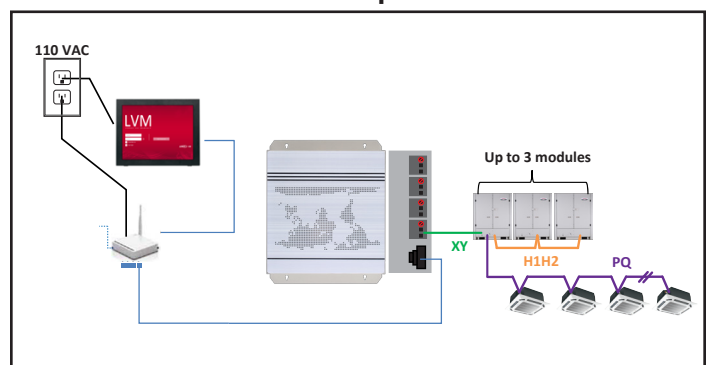
Figure 3. One VRF System Multi Module Example

See the LVM and BACnet Gateway installation manual (507897) for instructions for detailed connection information.

- **Log in.** See Figure 4.

    1. Tap the User Name field dropdown arrow to select from recently used user names or type your user name in the field.

Figure 4. Login Screen

    2. Enter your password and tap the Enter button on the virtual keyboard or the Arrow button to the right of the User Name field.

- **Remember Password.** See Figure 5.

    1. Tap the Remember Password checkbox to cause the LVM remember the user's password the next time the software is opened.

    2. Tap the Arrow button to access the LVM software.

Figure 5. Auto Login & Remember Password

- **Auto Login.** See Figure 5.
  1. Tap the Auto Login checkbox to cause the LVM software to automatically login each time the software is opened.
     - This applies to the current user account. The Remember Password checkbox must also be selected.
     - Tap the Change Account button to stop auto login.
- **Change Account.** See Figure #.
  1. Tap the Change Account button (once the LVM software is initialized) to log out of the current user's account and reset the Log In screen.
- **Anonymous Login.** See Figure #.
  1. Tap the Anonymous Login button to login anonymously. See Figure 5.

Table 1. User Account Types

Administrator	Default User Name: admin
	Default Password: 123456
General User	
Anonymous	

- **Language Selection.** See Figure 6.
  1. Tap the Language field to change the language shown on the LVM screens. The default is North American English. See Figure 6.

Figure 6. Select Language

Dashboard

- The LVM dashboard consists of nine screens.
- Each screen is accessed via tabs in the menu bar.
- The active tab label is underlined in blue.

- The dashboard is divided into four areas. Tap the Arrow button to the right of section name to access the corresponding function screen.
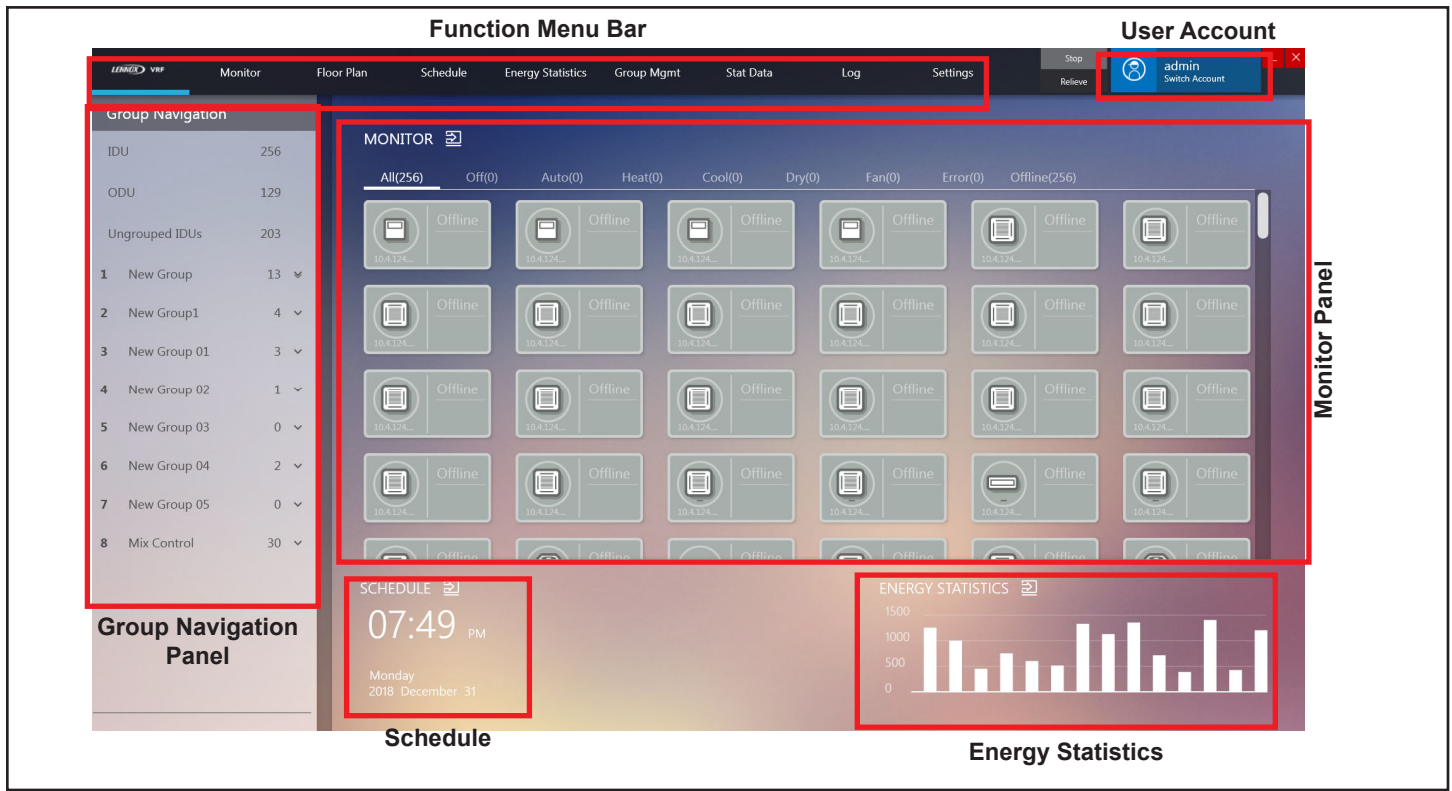

Figure 7. LVM Dashboard

Function Menu

- Tap the name of the function menu you want to access.

- The selected function menu is underlined in blue.

Current User Account

- The currently logged in user is shown on the right side of the screen.

- Click the Change Account button to return to log out of this account and return to the login screen.

Group Navigation Panel

There are two types of groups:

- System groups
  - Indoor units - all indoor units connected to LVM.
  - Outdoor units - all outdoor units connected to LVM.
- User-defined groups.
  - User-defined groups can have up to three levels.
  - Each Level 1 group has a group number.
  - Level 2 and Level 3 groups do not have a group number.
- The number of devices in each group (online and off line) displays to the right of the group name.

- Tap the group name to view the indoor units assigned to this group and any subgroups.

- Tap the group name to refresh the indoor units shown in the Monitor section.

- Tap the dropdown arrow to the right of the group's devices number to expand or contract a group.

- Long group names will be truncated. To see the full name hover the mouse over the truncated group name.

Monitor Panel

Displays the indoor units assigned to the selected group.

Click the Arrow to the right of "Monitor" or tap the Monitor Function Menu tab to access the Schedule interface.

- The default is to display all indoor units.
- Use the Groups Navigation panel to view the indoor units assigned to the group.
- Indoor units can be monitored or controlled.
- Outdoor units can be monitored only.
- Tap the Arrow to the right of "Monitor" to access the indoor unit Monitor/Control screen.

Schedule Information

Click the Arrow to the right of "Schedule" or tap the Schedule Function Menu tab to access the Schedule interface.

- The Schedule Information section of the Dash-board displays the scheduled events for the current day.

- The time of the next scheduled event is shown in bold at the top of the Schedule Information section.

- The next four scheduled events display. Past events are removed from the display.

- When all the scheduled events are executed, or if there is no schedule setup for the day, this section is blank.

Figure 8. Schedule Information

Energy Statistics

Click the Arrow to the right of "Energy Statistics" or tap the Energy Statistics Function Menu tab to access the Energy Statistics interface.

- A histogram of recent energy usage displays.

Figure 9. Energy Statistics

Device Monitor and Control

The Device Monitor screen can display information in three formats: icon (shown below), list and editing.

- Icon view displays indoor units, outdoor units and gateway parameters with icons. On the indoor unit interface, there is an area for sending control commands.

- List view displays indoor units, outdoor units and gateway parameters as a list. This view can display more details about the parameters than the icon view but has no area for sending control commands.

- Editing view allows you to change the configurable parameters of indoor units, outdoor units and gateways.
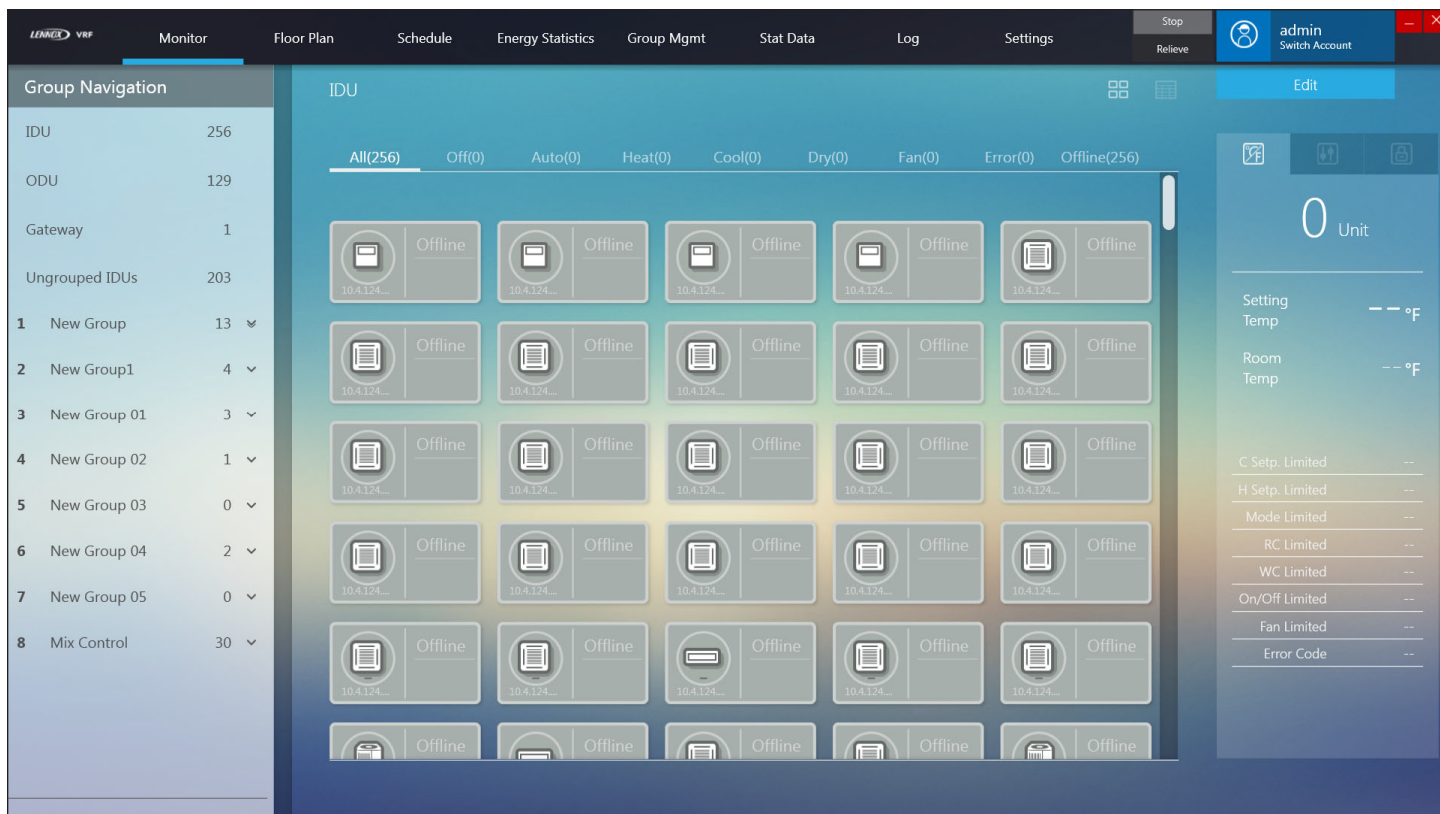
Figure 10. Device Monitor - Icon View

Icon View
Group Navigation Panel

Select the group that contains the indoor units you want to monitor or control.

- System groups
  - Indoor units - all indoor units connected to LVM.
  - Outdoor units - all outdoor units connected to LVM.
- User-defined groups.
  - User-defined groups can have up to three levels.
  - Each Level 1 group has a group number.
  - Level 2 and Level 3 groups do not have a group number.

- The number of devices in each group (online and off line) displays to the right of the group name.
- Tap the group name to view the indoor units assigned to this group and any subgroups.
- Tap the group name to refresh the indoor units shown in the Monitor section.
- Tap the dropdown arrow to the right of the group's devices number to expand or contract a group.
- Long group names will be truncated. To see the full name hover the mouse over the truncated group name.
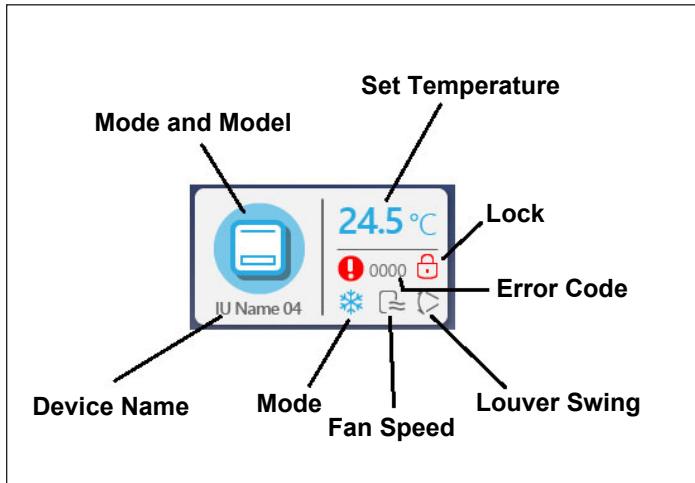
Monitor Panel

Displays the indoor units assigned to the selected group.

Indoor Unit Icon

Displays the indoor unit's current parameters and status. See Figure 11.

The selected indoor unit will have a red line above the icon.

Figure 11. Indoor Unit Icon View

- **Mode and Model.** Displays the indoor unit type and operation mode.
  - Operation mode is indicated using the color code in Figure 12.

Auto	Cool	Dry	Heat	Fan	Standby (Off)

Error	Offline				

Figure 12. Indoor Unit Operation Mode

- **Device Name.** Displays the name assigned to this indoor unit. Display is limited to 10 characters.
- **Set Temperature.** Displays the indoor unit setpoint. During Auto mode, the cooling setpoint will show when the unit is operating in cooling and the heating setpoint will display when the unit is operating in heating.

- **Lock.** If the indoor unit function is locked by a controller, the lock icon will display.
- **Error Code.** If the indoor unit is in a fault state, the error code will display. Unit operational information, setpoint, fan, etc., does not display.
- **Louver Swing.** This icon indicates the indoor unit's louver position and if the louver movement is set to auto or is turned off. See Figure 13.

Auto	Position 1	Position 2	Position 3	Position 4	Position 5	Off

Figure 13. Indoor Unit Louver Position/Operation Icons

- **Fan Speed.** This icon indicates the indoor unit's fan speed. See Figure 14.

Fan Speed	Icon
Low	
Mid	
High	
Auto	

Figure 14. Indoor Unit Operation Mode Icons

- **Mode.** This icon indicates the unit's mode of operation. When the unit is in Auto mode, the actual operation of the unit, cooling or heating, icon will display. See Figure 15.
  - Fan speed is not adjustable during Dry mode.
  - No setpoint is displayed during Fan mode.

Auto	Cool	Dry	Heat	Fan	Standby (Off)
					No display

Error	Offline				
No display	No display				

Figure 15. Indoor Unit Operation Mode Icons

- **Background color.** The background color of the indoor unit icon indicates that the unit is Powered-on or in error (white) or Powered-off or offline (gray).
- **Offline.** If the indoor unit is offline, the operational information, setpoint, fan, etc., does not display.

Indoor Unit Classification

The menu bar at the top of the Monitor screen allows you to view indoor units via the following classifications: All, Off, Auto, Heat, Cool, Dry, Fan, Error, Line Off. For example, tap Cool to view all indoor units in this group that are in cooling mode.
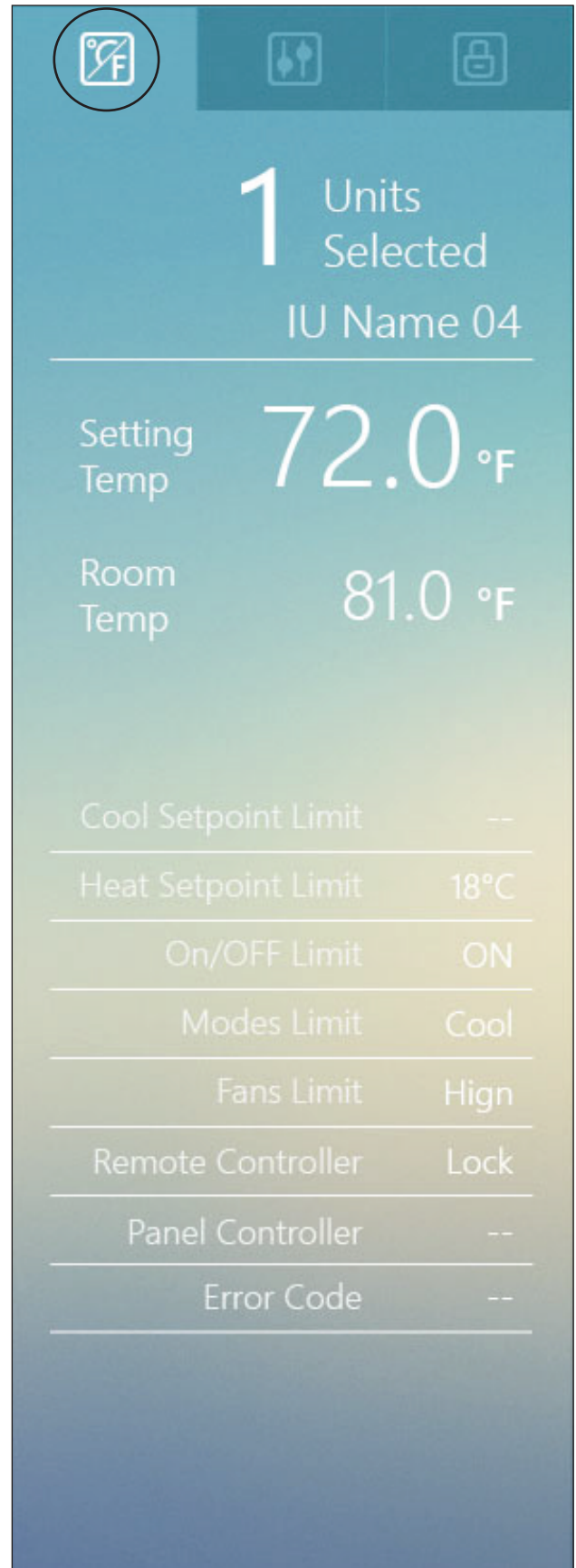
Indoor Unit Information and Control

The Indoor Unit Control Panel on the right side of the Monitor screen displays detailed information about the selected indoor unit, allows control of the indoor unit and allows for end-user operation limitations to be set.

Indoor Unit Detailed Information

The Control Panel on the right side of the Monitor screen displays detailed information about the selected indoor unit. See Figure 16.

Detailed information displays for only the selected indoor unit.

Table 2. Indoor Unit Detailed Information

IU Name	Assigned name of selected indoor unit
Setting Temp	Setpoint of indoor unit
Room Temp	Value of T1 (return air) sensor
Cooling Setpoint Limit	Cooling setpoint lower limit lock.
Heating Setpoint Limit	Heating setpoint upper limit lock.
ON/OFF Limit	ON/OFF lock
Mode Limit	Mode lock
Fans Limit	Fan lock
Remote Controller	Function is locked from the LVM controller.
Panel Controller	Function is locked from the connected wired local controller.
Error Code	Current error code

Figure 16. Indoor Unit Detailed information

Indoor Unit Control

The Control Panel on the right side of the Monitor screen allows the control of one or more indoor units. See Figure 17.

Table 3. Indoor Unit Control

Units Selected	When selecting multiple indoor units, all selected indoor units must be the same type.
Power Indicator	Indicates if the indoor unit(s) is powered on or powered off.
Setting Temp	• Tap the Plus or Minus button to set the setpoint. If the unit(s) is in Auto mode, there will be a cooling setpoint and a heating setpoint displayed. • Each tap equals .5 degrees F or 1 degree C. Subject to the set temperature interval. • In Auto mode, the cooling setpoint must be greater han or equal to the heating setpoint. • Fan speed is not adjustable during Dry mode. • No setpoint is displayed during Fan mode.
Mode	Tap the dropdown arrow to set the indoor unit mode of operation.
Fan	Tap the dropdown arrow to set the indoor unit fan speed.
Swing U-D	Tap the dropdown arrow to set the unit's louver position and operation.

Tap the Confirm button to send the commands to the indoor unit(s).
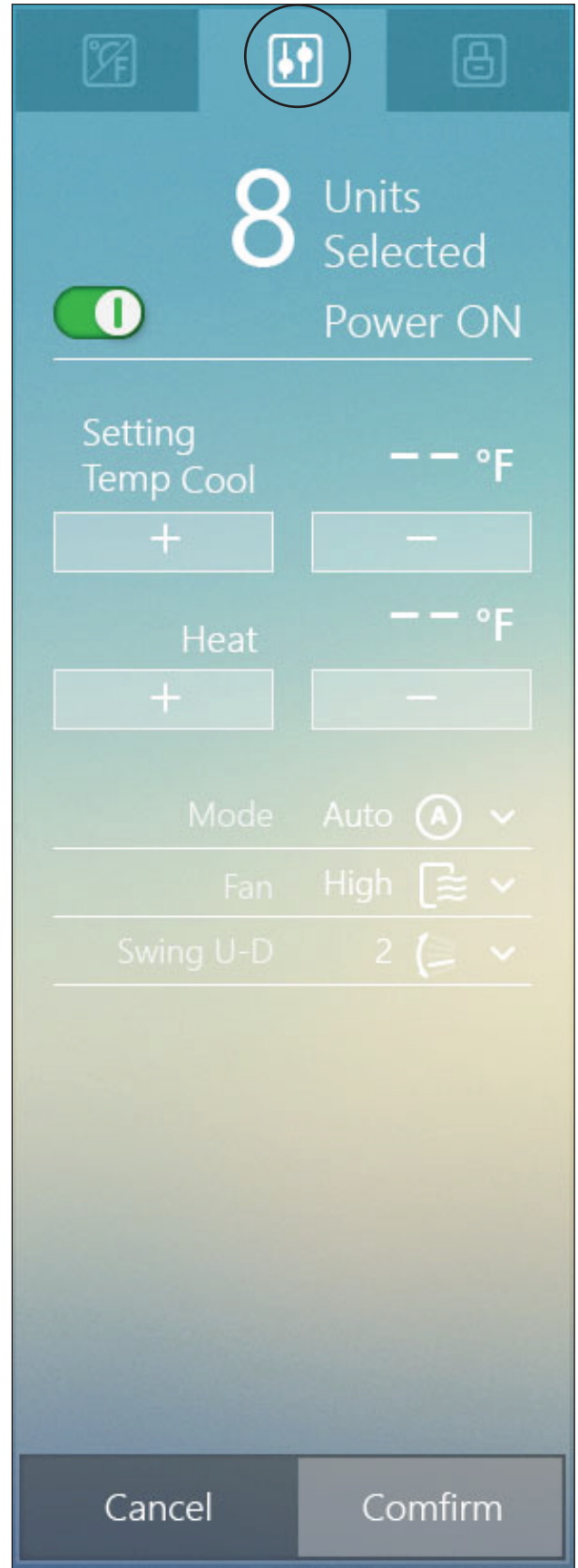
Figure 17. Indoor Unit Control

Indoor Unit Limitations & Locks

The Control Panel on the right side of the Monitor screen allows you to restrict end-user access to some functionality at the local controller. See Figure 18.

Table 4. Indoor Unit Limitations & Locks

Units Selected	Displays the number of units selected.
Cooling Setpoint Limit	Cooling setpoint lower limit lock.
Heating Setpoint Limit	Heating setpoint upper limit lock.
Mode Limit	Mode lock
Remote Controller	Function is locked from the LVM controller.
Panel Controller	Function is locked from the connected wired local controller.
ON/OFF Limit	ON/OFF lock
Fan Speed Limit	Fan lock

Tap the Confirm button to send the commands to the indoor unit(s).
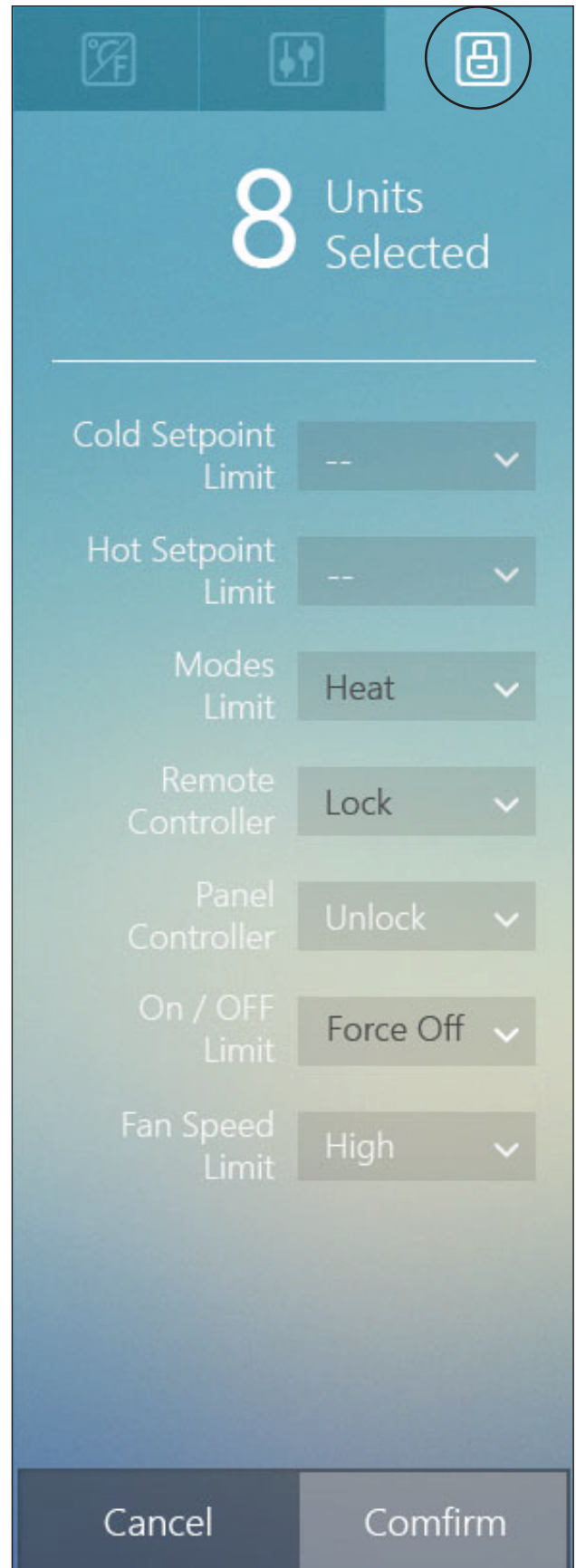
Figure 18. Indoor Unit Limitations & Locks

Outdoor Unit Monitoring and Control

In the Group Navigation panel on the left of the screen, tap Outdoor Units to monitor outdoor unit operation.
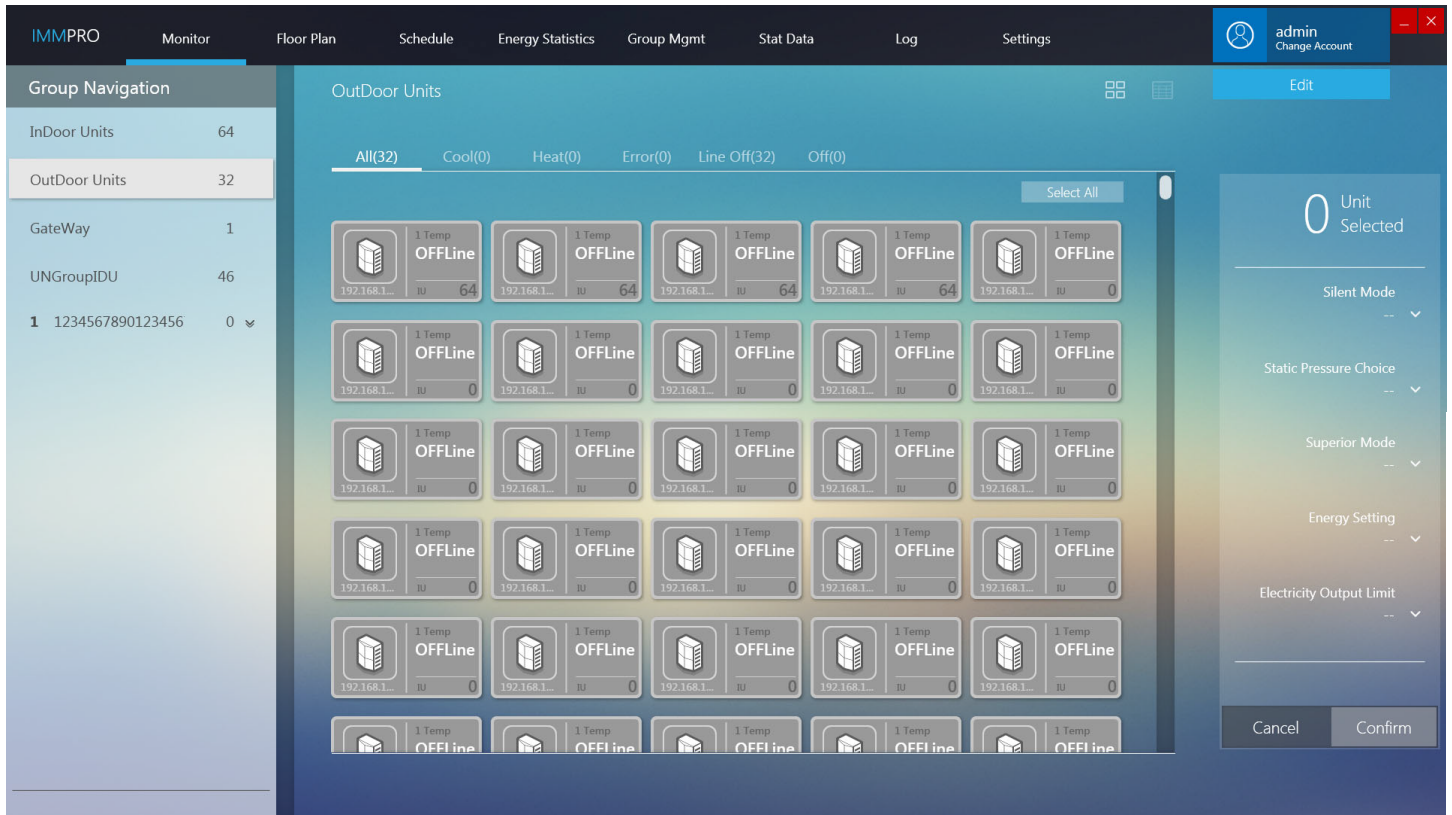
Figure 19. Outdoor Unit Monitoring & Control

Outdoor Unit Icon
Displays the outdoor unit's current parameters and status. See Figure 20.

The selected outdoor unit will have a red line above the icon.
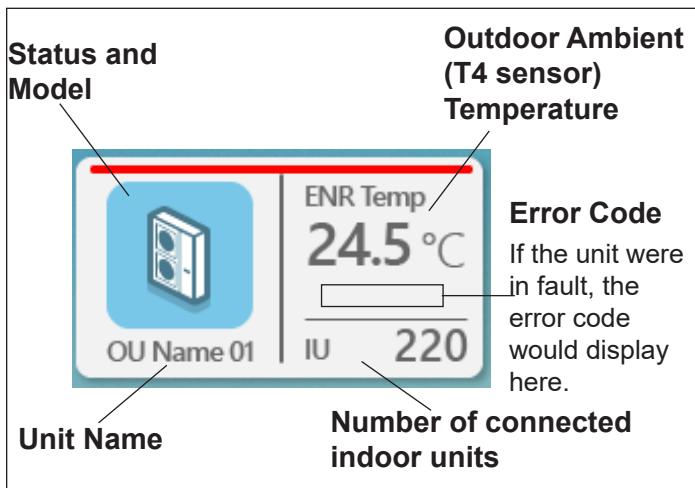
Figure 20. Outdoor Unit Icon View

- **Mode.** This icon indicates the unit's status. See Figure 21.

Cool	Heat	Standby (Off)	Error	Offline

Figure 21. Outdoor Unit Operation Status

- **Model.** This icon indicates the unit's type - Mini-VRF or VRF outdoor unit. See Figure 22.

Mini-VRF unit Single Phase   VRF Outdoor Unit 3-Phase
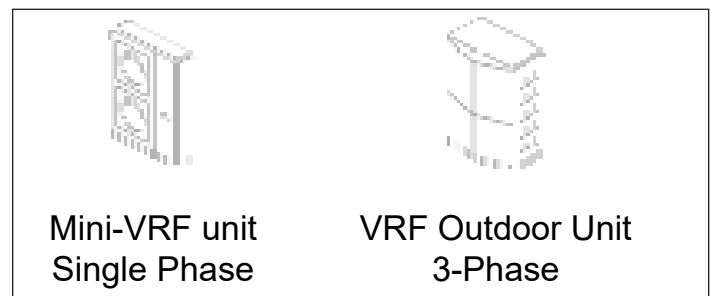
Figure 22. Outdoor Unit Model

- **Background color.** The background color of the indoor unit icon indicates that the unit is Powered-on or in error (white) or Powered-off or offline (gray).

Outdoor Unit Control

The Control Panel on the right side of the Monitor screen allows the control of one or more outdoor units. See Figure 23.

Table 3. Indoor Unit Control

Units Selected	
Power Indicator	Indicates if the outdoor unit(s) is powered on or powered off.
Silent Mode	Tap the dropdown arrow to set the outdoor unit's silent mode operation level.
Priority Mode	Tap the dropdown arrow to set the outdoor unit's priority Mode.
Energy Setting	Tap the dropdown arrow to set ON/OFF.
Electricity Output Limit	Tap the dropdown arrow to set ON/OFF.
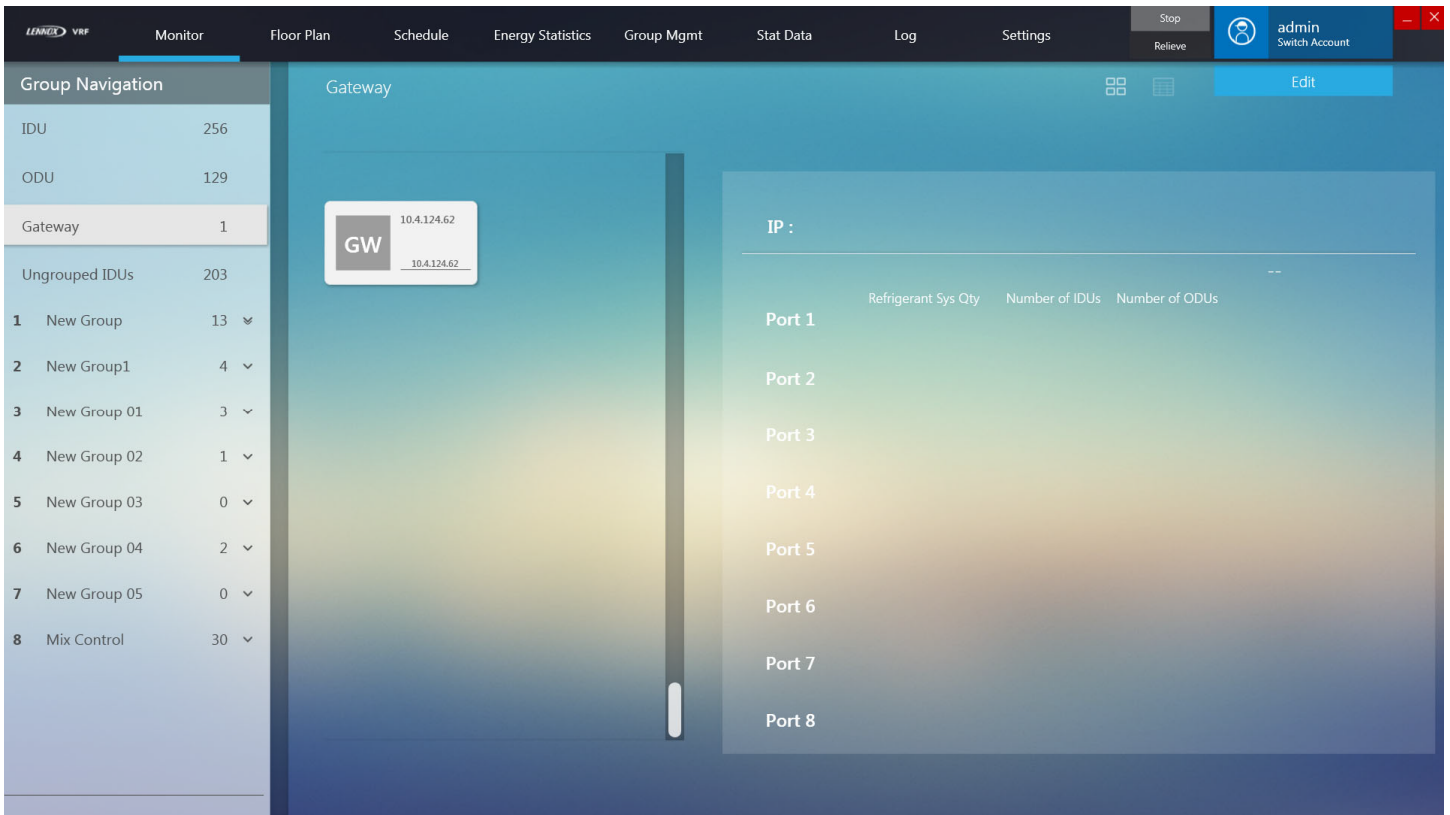
Tap the Confirm button to send the commands to the indoor unit(s).
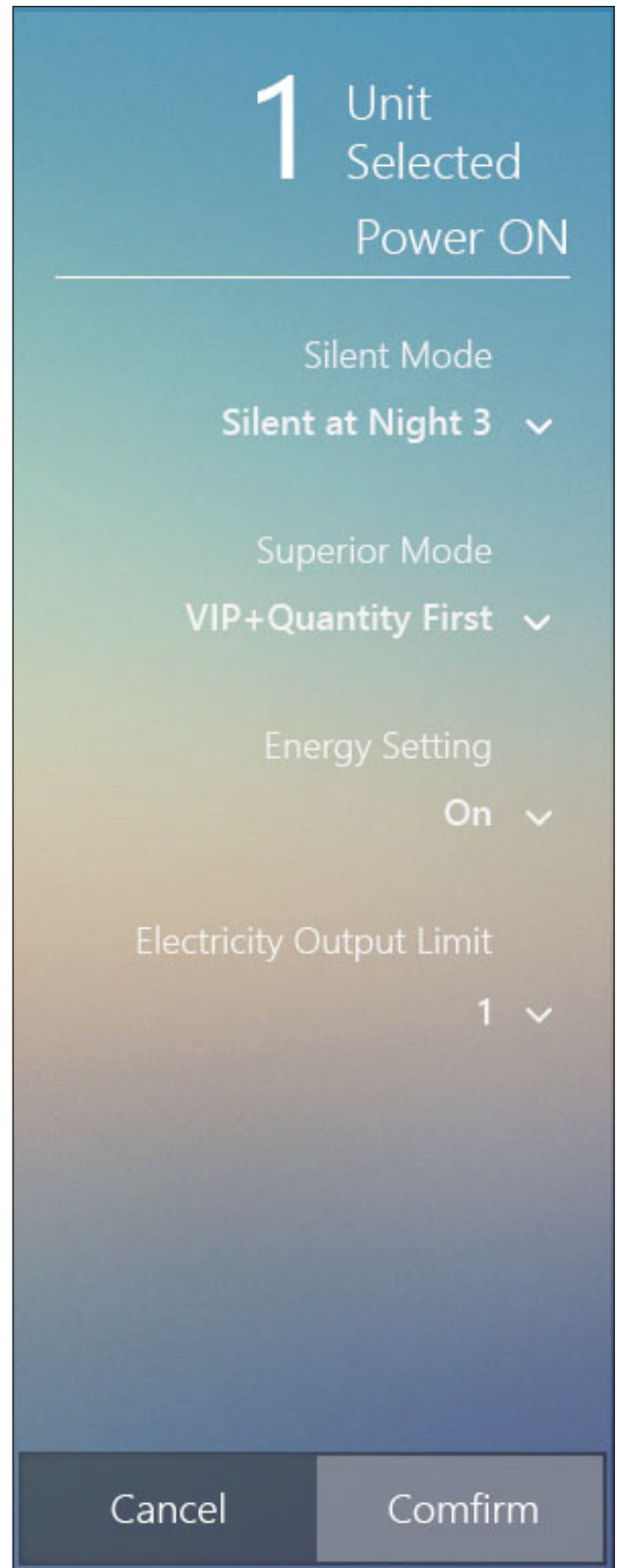
Figure 23. Outdoor Unit Control

Gateway Information

The connected gateway's name and IP address are displayed.

Figure 24. Gateway Information

Figure 25. Gateway Online

Figure 26. Gateway Offline

Gateway Detailed Information

Select a gateway. Detailed information about the gateway is displayed on the right, including the number of refrigerant systems, as well as the total number of indoor units and outdoor units at each port of the gateway.

	Refrigeration System	Indoor Unit	Outdoor Unit
Port1	0	0	0
Port2	0	0	0
Port3	0	0	0
Port4	8	64	32
Port5	0	0	0
Port6	0	0	0
Port7	0	0	0
Port8	0	0	0

Figure 27. Gateway Detailed Information

Schedule Management

Schedule Display. Display by date, by indoor unit, by schedule and by schedule template. (Default view)

Schedule Edit. Edit schedule and edit schedule template. The Edit button is only available when Schedule Template or Schedule Set-up is selected.

Table 4. Schedule

System Overview	View schedule by date
Indoor Unit Overview	View schedule by indoor unit
Schedule Template	View schedule template
Schedule Set-up	View schedule by schedule planning
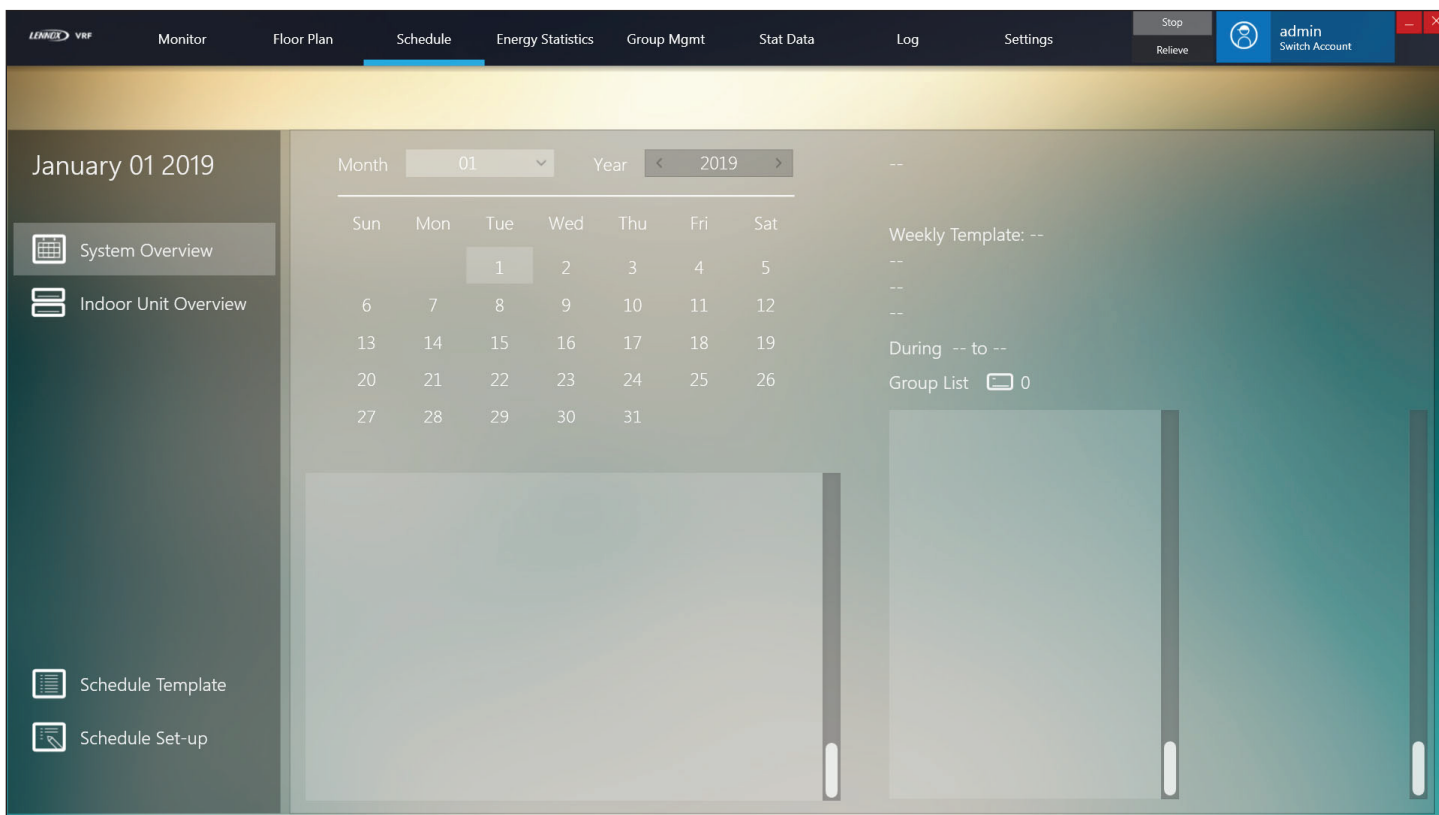
Figure 28. Schedule Information

Schedule Template Editing

Three types of schedule templates are available: Daily Template, Weekly Template and Special Template.

Table 5. Schedule Template Types

Daily Template	Sets the schedule commands for the current day. Supports up to 20 schedule commands per day.
Weekly Template	Sets the daily templates from Monday to Sunday (The templates are from the existing daily templates. For example, if no schedule is executed on Monday, no daily template is selected).
Special Template	Sets some special dates and the daily templates to be executed during these special dates (The templates are from the existing daily templates).

NOTE - *Anonymous users cannot edit schedules.*

Create or Edit a Schedule Template

To create or edit schedule templates, tap Schedule Template and the tap the Edit button.

Figure 29. Daily Templates

Tap the Daily template button. The existing Daily Templates display on the left side of the screen.
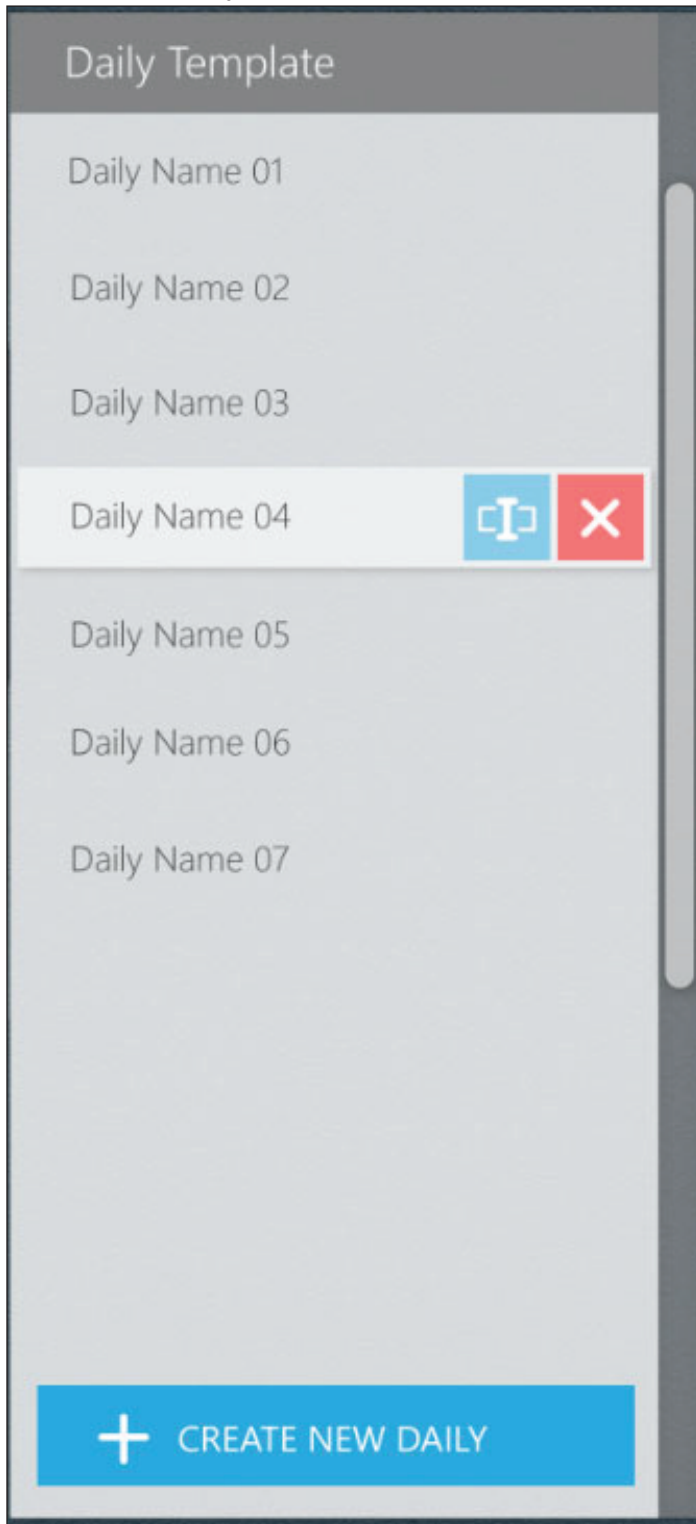
Figure 30. Edit Daily Templates

Long Daily Template names will be truncated. To see the full name hover the mouse over the truncated name.
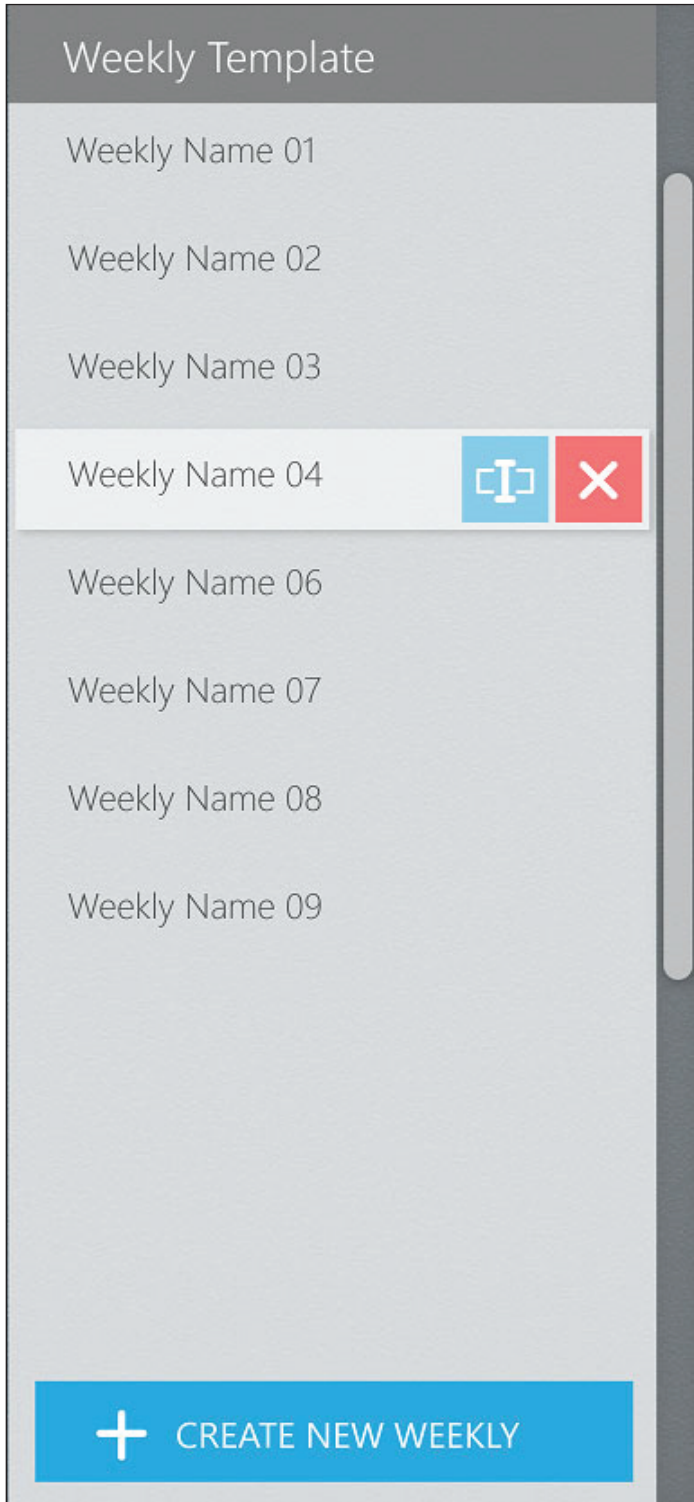
- Tap the Create New Daily button to create a daily template. The template will be given the default name "Daily Template*"; "*" indicates a numerical value like 01, 02, 03 and so on.
- Tap the X button to delete a daily template.
- Tap the Name Edit button to change the name of the daily template. Tap the checkmark button to save the edits.
- Tap the Save&Exit edit button to save the changes to the daily template and exit the Edit screen.
- The system will prompt you to save any edits if you exit the screen without saving.

Daily Schedule Template Command
Daily Template
Create, edit and delete events for the selected daily schedule template. Up to 20 events per daily schedule template.
- Tap the + button to add an event to the daily template.
- Tap the X button to delete an event from the daily template.
- Tap the Edit button to modify an event in the selected daily schedule template. Tap the checkmark button to save the edits.

Type	Time	On/Off	Mode	Cool	Heat	Fan	RC limited	WC limited	Edit
HR	PM 12:0	ON	Auto	79°F	65°F	Auto	--	--	
HR	PM 6:47	ON	Auto	74°F	63°F	Medium	Limited	Unlimited	
HRV	PM 6:47	ON	BYP	--	--	Low	--	Limited	
FAPU	PM 6:47	ON	Cool	52°F	--	Auto	Limited	Unlimited	

Figure 31. Daily Template Events

Table 6. Schedule Template Events Commands

Type	Command type. Each time the command type and switch are modified, the parameters are restored to the default settings.
Time	Command execution time: 12 hours, 24 hours
ON/OFF	ON/OFF
Mode	Set mode
Cool	Set cooling temperature in Auto mode. Set cooling temperature and dehumidification temperature.
Heat	Set heating temperature in Auto mode. Set heating temperature.
Fan	Set fan speed.
RC Limited	Remote controller lock
WDC Limited	Wired local controller lock
Edit	Edit or Delete button

Weekly Template

Tap the Weekly template button. The existing Weekly Templates display on the left side of the screen.
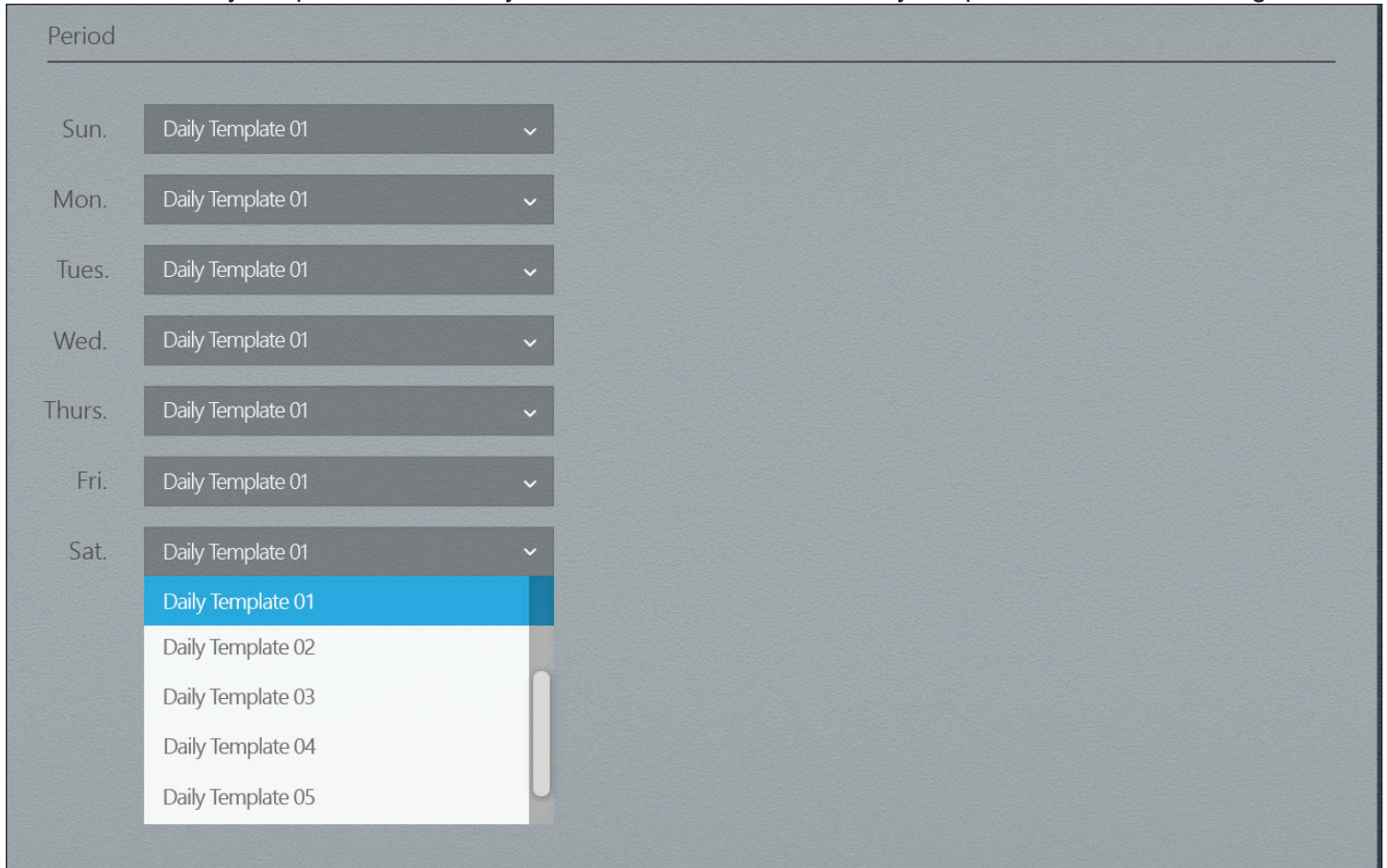
Long Weekly Template names will be truncated. To see the full name hover the mouse over the truncated name.

- Tap the Create New Weekly button to create a weekly template. The template will be given the default name "Weekly Template*"; "*" indicates a numerical value like 01, 02, 03 and so on.
- Tap the X button to delete a weekly template.
- Tap the Name Edit button to change the name of the weekly template. Tap the checkmark button to save the edits.
- Tap the Save&Exit edit button to save the changes to the weekly template and exit the Edit screen.
- The system will prompt you to save any edits if you exit the screen without saving.

Weekly Schedule Template Command
The weekly template does not directly edit the schedule command.
• Select the daily template for each day of the week. The selected daily template is shown on the right.

Figure 31. Select the Daily Template for Each Day of the Weekly Template

Special Template

Special Day templates allow you to setup holiday or other "special" day schedules.
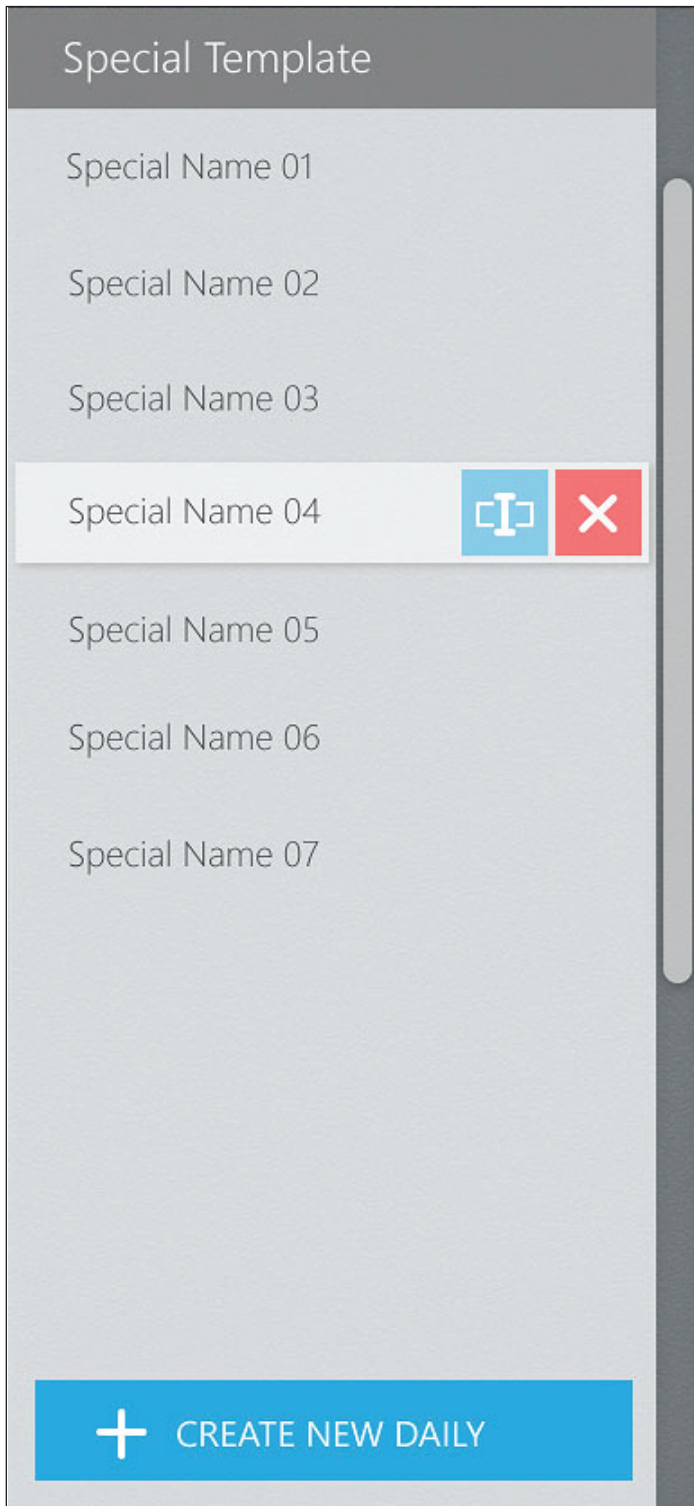
Figure 32. Edit Weekly Templates

Tap the Special template button. The existing Special Templates display on the left side of the screen.

Long special template names will be truncated. To see the full name hover the mouse over the truncated name.

- Tap the Add New Day button to create a special day template. The template will be given the default name "Special Template*"; "*" indicates a numerical value like 01, 02, 03 and so on.

- Select the day, date, or date range for the special day.

- Tap the X button to delete a special template.

- Tap the Name Edit button to change the name of the special template. Tap the checkmark button to save the edits.

- Tap the Save&Exit edit button to save the changes to the special template and exit the Edit screen.

- The system will prompt you to save any edits if you exit the screen without saving.

Special Template Command

The special template does not directly edit the schedule command.

• Select the daily template for the day of the month.

Figure 33. Setup Special Template

Group Management

Create groups of Indoor units to make monitoring and controlling the units easier for the end user.

The Group Management screen allows you to create groups of indoor units, edit groups to add or remove indoor units or delete groups.

These groups display in the Group Navigation Panel on the Dashboard.
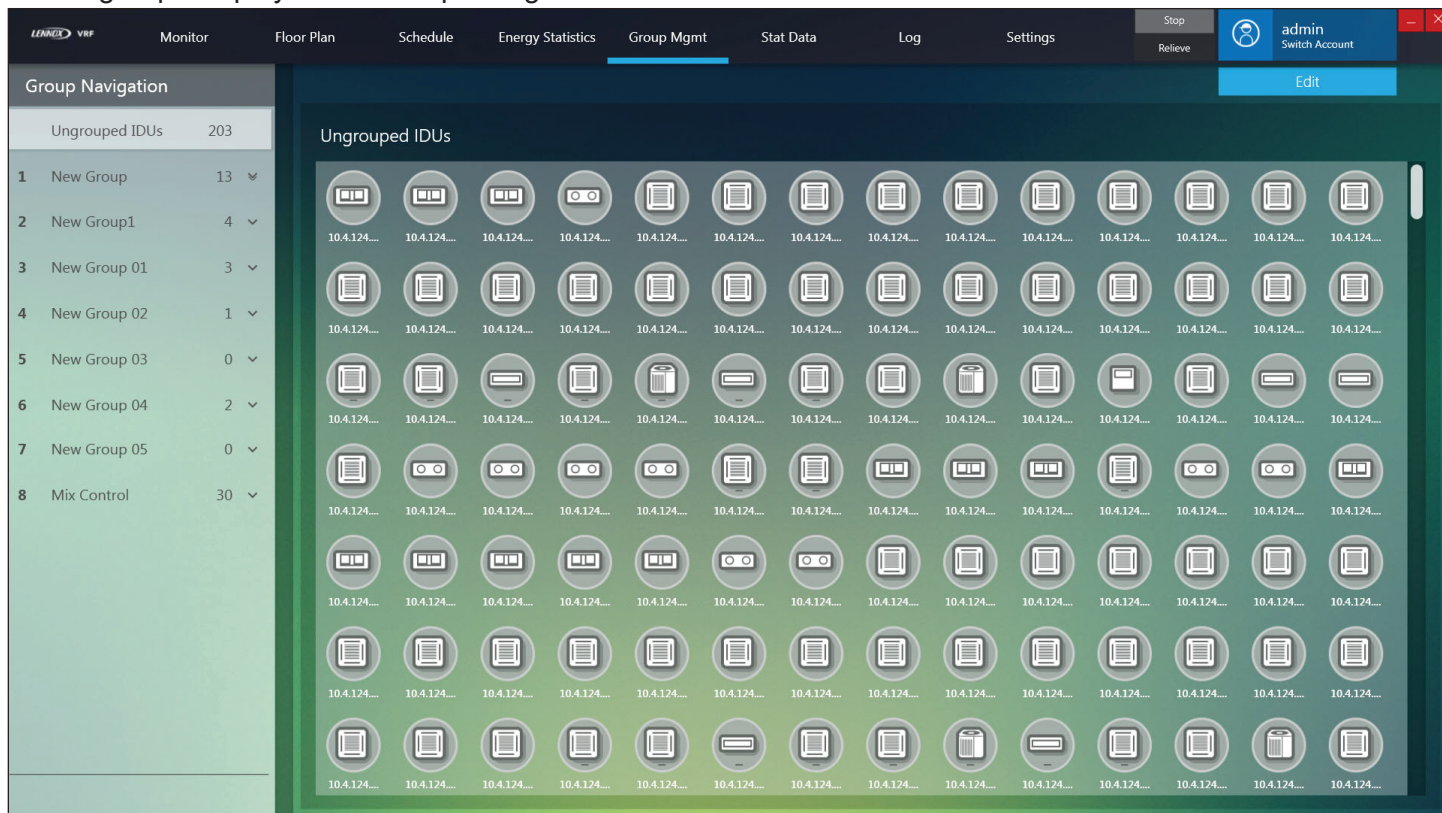
Figure 34. Group Management Screen

- User-defined groups can have up to three levels.
  - Each Level 1 group has a group number.
  - Level 2 and Level 3 groups do not have a group number.
- Long special template names will be truncated. To see the full name hover the mouse over the truncated name.

Click the Edit button to edit groups.
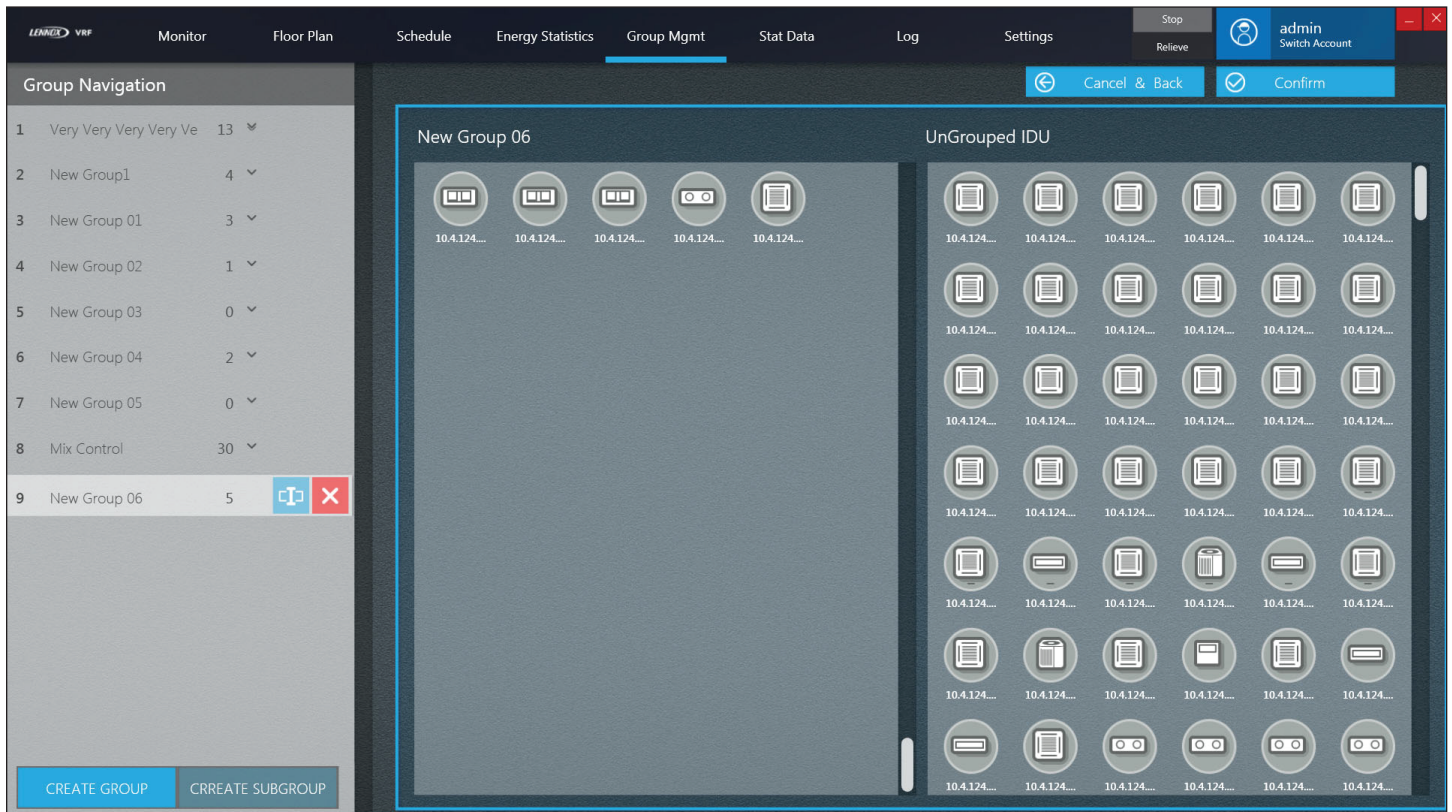
Figure 35. Edit Groups

From the Edit Groups screen, you can create groups, add or remove indoor units from groups and delete groups.

All current groups display in the left Group Navigation panel.

Indoor units assigned to the selected group display in the center panel.

Unassigned indoor units display in the right UnGrouped IDU panel.

- Tap the Create Group button to create a new Level 1 group.
- Tap the Create Subgroup button to create a new Level 2 or Level 3 subgroup.
  - The new group will be given the default name "New Group*"; "*" indicates a numerical value like 01, 02, 03 and so on.
  - Tap the Name Edit button to change the name of the special template. Tap the checkmark button to save the edits.
- To assign an indoor unit to the selected group, tap the indoor unit in the UnGrouped IDU panel and and drag it to the center panel.
- To assign an indoor unit to any group, tap and drag the indoor unit in the UnGrouped IDU panel and

drag it directly on top of the group name in the left Group Navigation panel.
- To remove an indoor from the group, tap the indoor unit in the center panel and drag it to the UnGrouped IDU panel.
- Tap the Confirm button to save all changes.
- Tap the Cancel & Back button to cancel all changes.

Energy Statistics

Data statistics are the operating records of devices. You can use these statistics to view changes in the operating status of devices.

Supported statistical types are as follows:

1. Indoor unit operating data
2 Outdoor unit operating data
3 Gateway operating data
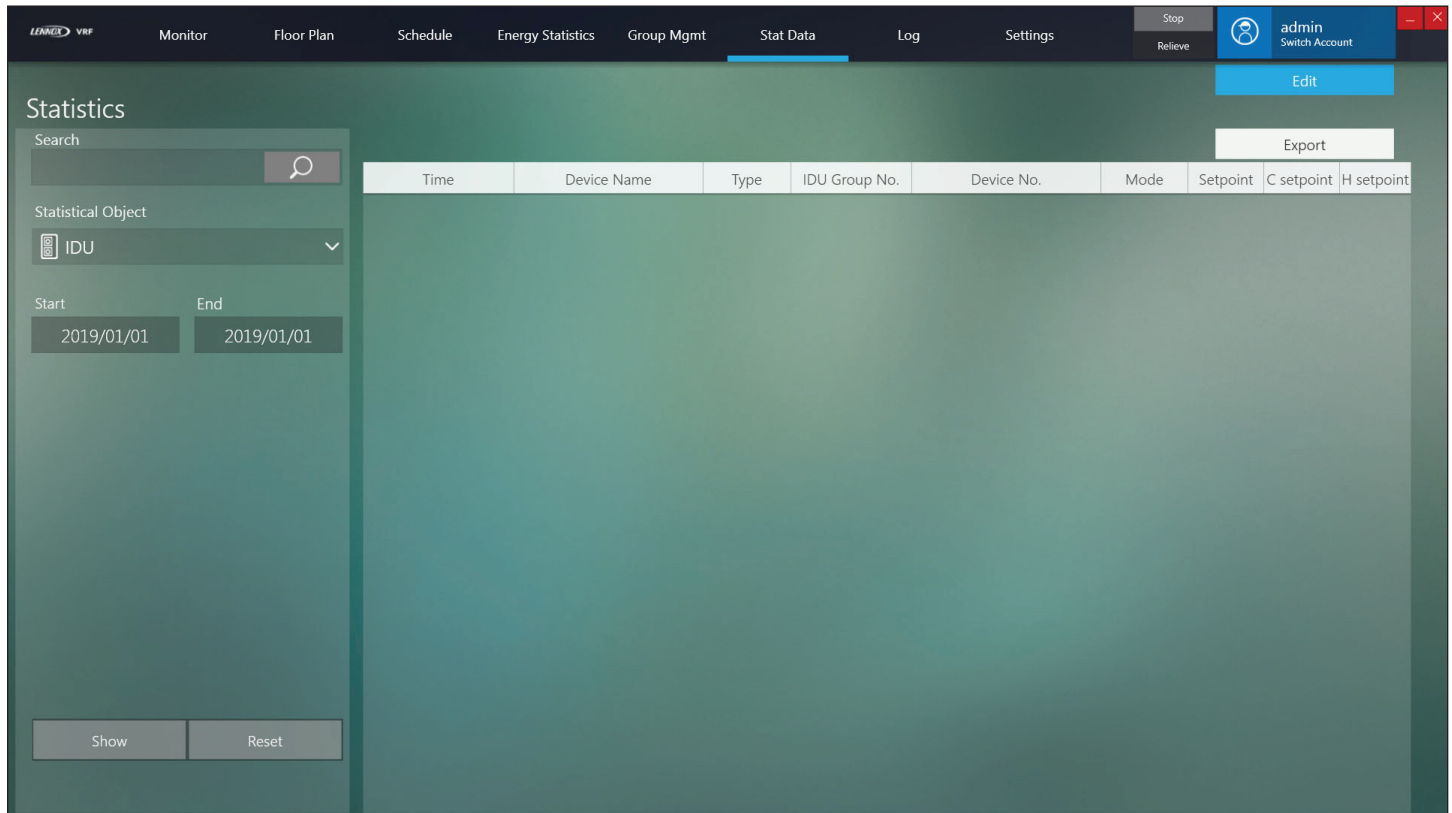
Figure 36. Energy Statistics Screen

1. Select the type of device to view in the Statistical Object field.
2. Enter start and end dates.
3. Tap the Edit button to select the specific devices to include. If no selections are made, ALL devices of this type are included.
4. Tap the Confirm button.
5. Tap the Show button to view the statistical data on the screen.
6. Tap the Export button to export the data in .csv or Excel format.

NOTE - Anonymous users cannot access the Energy Statistics screen.

Operation Log

The Operation Log screens records the commands sent by the LVM and the login information of the LVM. There are four types of logs:

1. Control command: commands sent on the Device Monitor interface
2. Schedule command: commands sent by the Schedule Management interface
3. Lock command: lock commands sent on the Device Monitor interface
4. Login: login information of the LVM
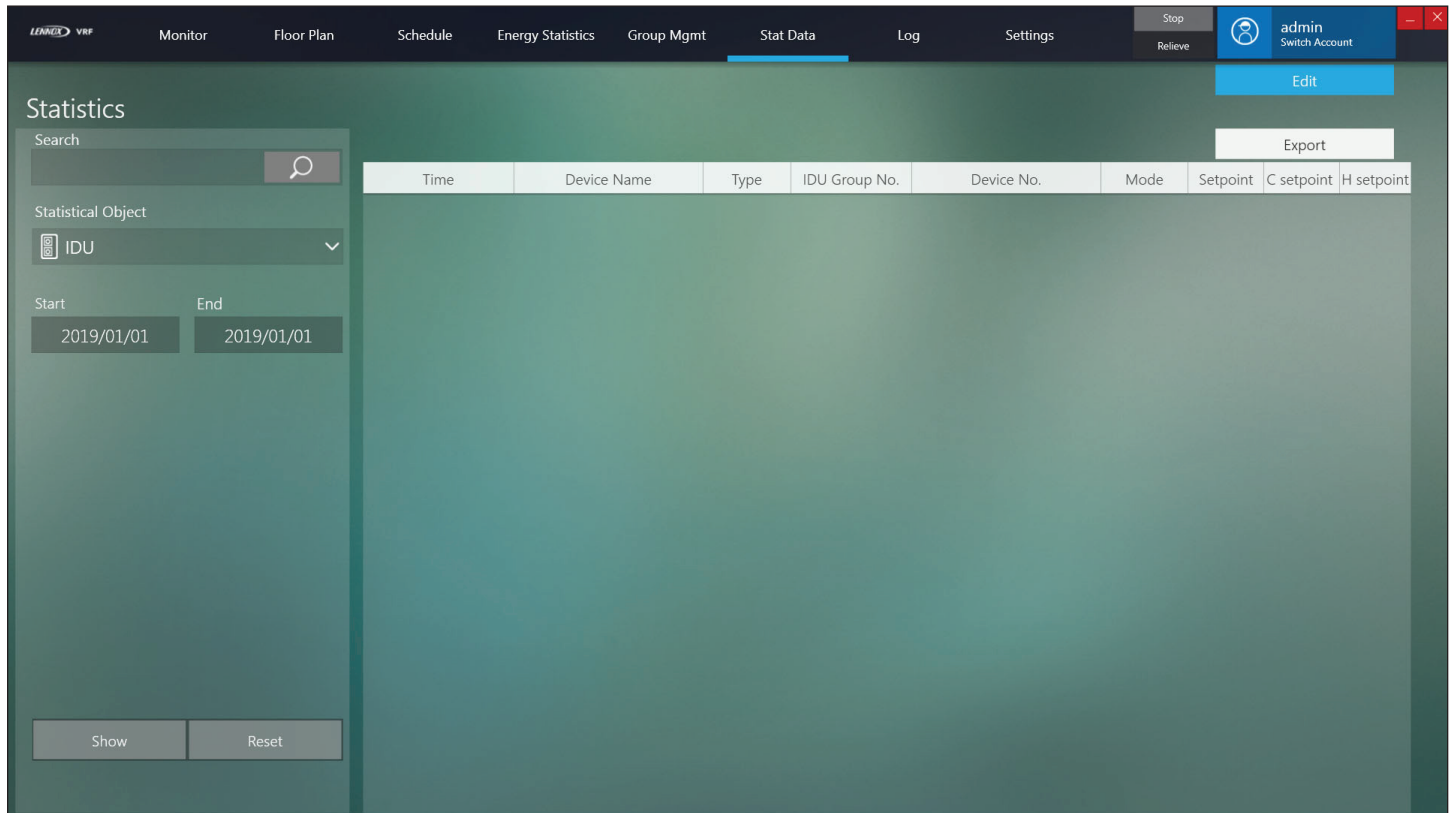
Figure 37. Operation Log Screen

1. Select the type of log to view in the Type field.
2. Enter start and end dates.
3. Tap the Show button to view the logged data on the screen.
4. Tap the Export button to export the data in .csv or Excel format.

NOTE - Anonymous users cannot access the Operation Log screen.

LVM Settings

Setup the LVM software using the Settings Screen. Login required after changing software settings.

Figure 38. LVM Settings Screen

NOTE - General Administration Users cannot create a new user, modify Set Temperature Interval or set a password for the emergency stop feature. Anonymous users cannot access the Operation Log screen.

General Settings

These six items can be set on the General Setting interface:

1. Interface language
2. Temperature unit: set the temperature interval
3. 12-hour/24-hour clock
4. Project file link
5. Emergency stop
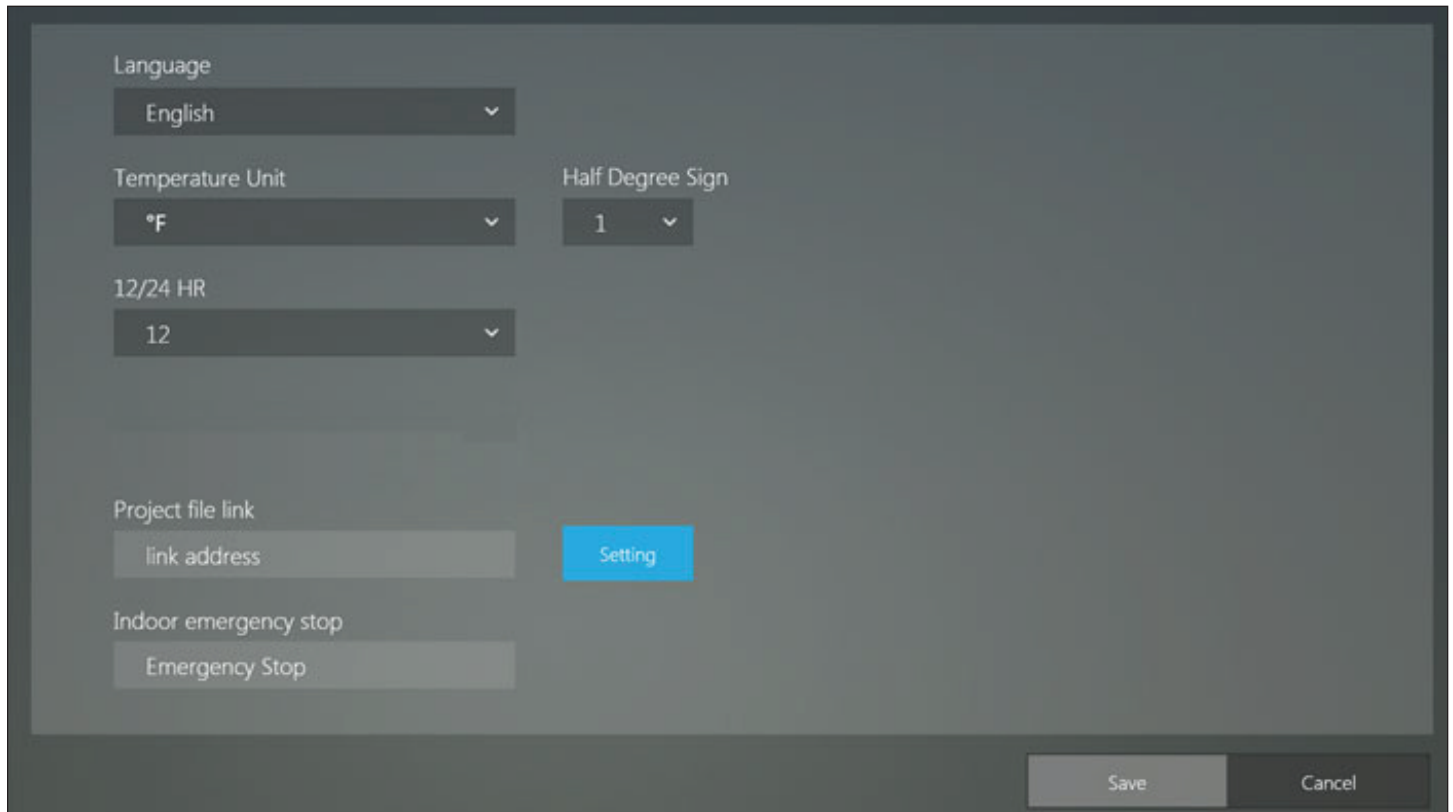
Figure 39. General Settings

1. Select the language you want to display on the screen. English or Chinese.
2. Select the temperature unit you want to display. Fahrenheit or Celsius.
3. Select the temperature interval.
4. Select 12-hour clock or 24-hour clock.
5. Select the Project File link.
6. Tap the Emergency Stop button to sent an emergency stop command to the outdoor unit. Tap the Relieve button to send a command to the outdoor unit to end the emergency stop. A password is required to send a Stop or Relieve command. The default password is 123456.

Account Settings

- Tap the Add button to create a new user account.
- Tap the Edit button to edit a user account.
- Tap the Delete button to delete a user account.
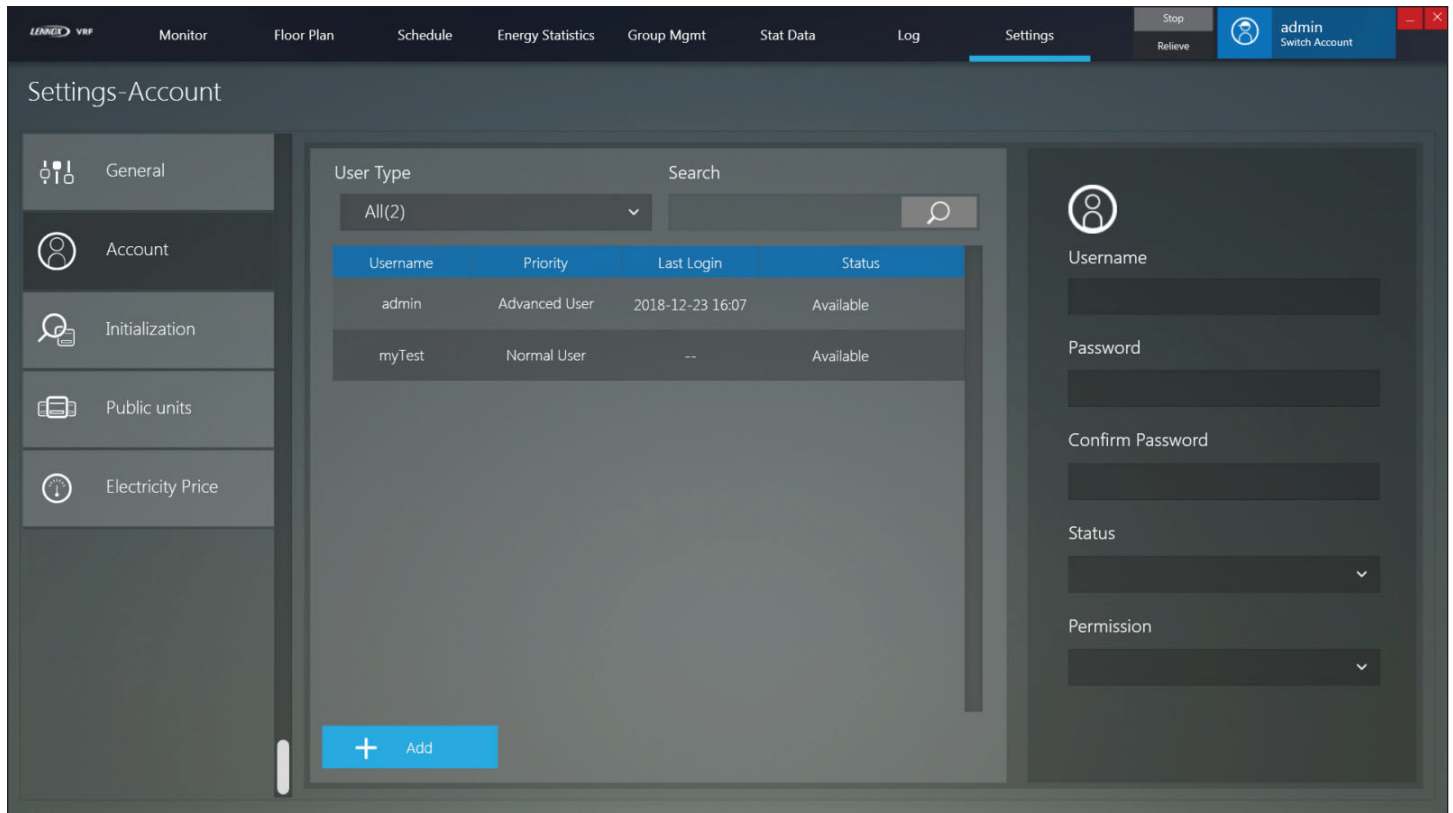
Figure 40. Account Settings

Table 7. User Account Types
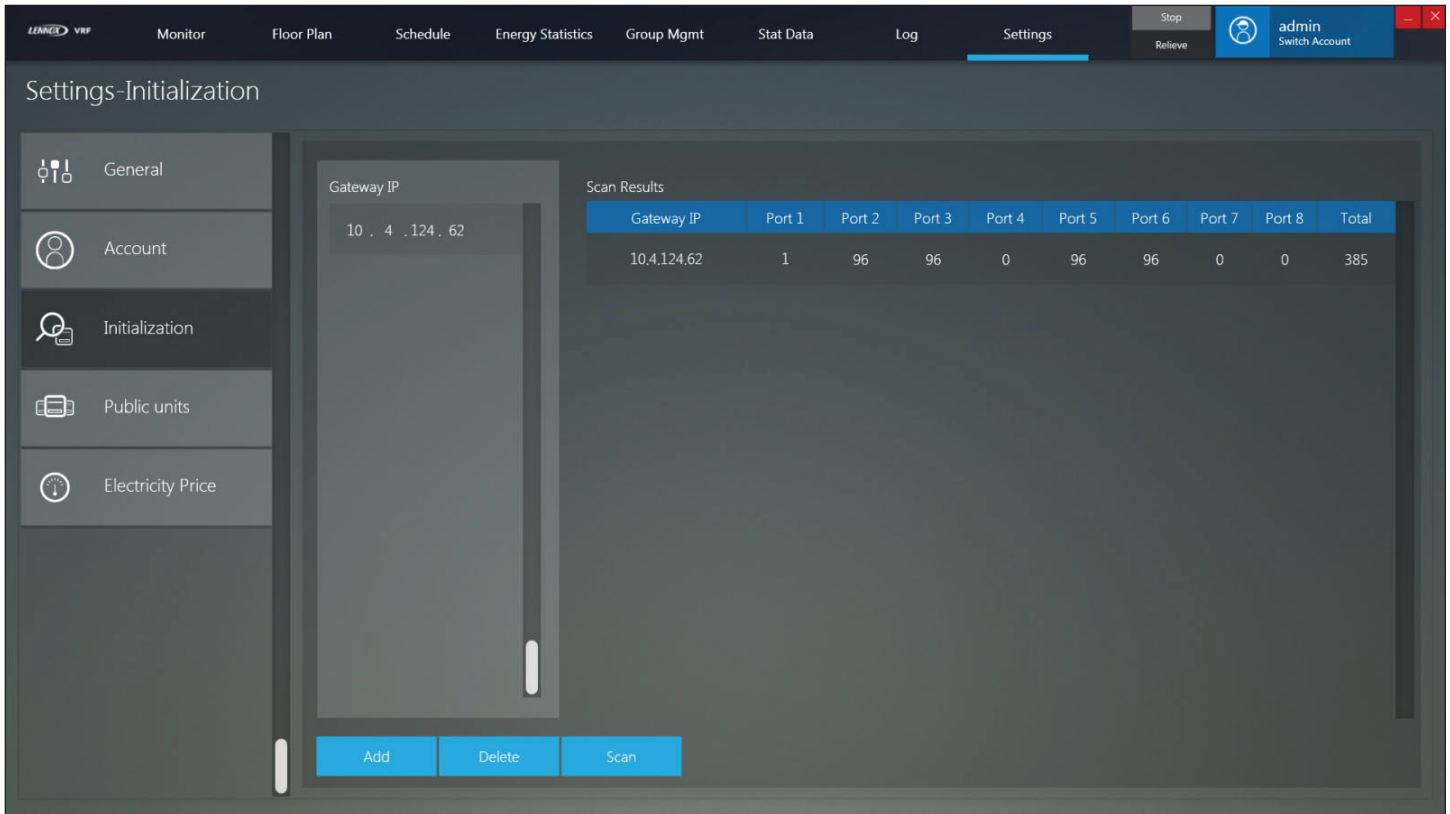
Advanced Administrator	The system requires at least one admin account. Can view all other users, create, delete and disable accounts including other advanced or general administrator accounts, modify user name and passwords of any user. Cannot delete own account user account, modify user name or account authority. Can change own password.
General Administrator	Can view own account. Cannot create or delete user accounts, modify user name or account authority. Can change own password.
Anonymous (Guest) Account	Monitor only account. Cannot access Settings screen.

1. Tap the Add button to create a new user account.
2. Tap the Edit button to use the Edit panel on the right to enter the new user information.
3. Enter User Name.
4. Enter Password.
5. Confirm the password.
6. Select the user status. (Available (active) or Unavailable (inactive).
7. Select the user permissions (Advanced or General).
8. Tap the Save button.

Initialization

This feature enables LVM to create IDU, ODU and pure gateway objects. Based on these objects, functions of the LVM such as schedule, group, statistics, energy consumption, and logs can be implemented.

The initialization feature allows you to confirm the address and number of IDU, ODU and pure gateway objects.

Figure 41. Initialization

Public Units

Designate indoor units as "public" for use in monitoring energy statistics.

Figure 42. Public Units

Electricity Prices

Enter electricity price and configure the parameters used for use in monitoring energy statistics.

Figure 43. Electricity Prices

Appendix A

Maximum System Connections
- Up to 320 VRF refrigerant systems
- Up to 960 VRF Outdoor units
- Up to 2560 VRF or Mini-Split indoor units
- Up to 2560 devices (including outdoor and indoor units)

NOTE - *Refer to wiring diagrams for connection wiring details.*

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