

# VRF Smart Gateway Installation Instructions

SI-VRFCBN02-0Sx



24-10143-1183, Rev. B

(barcode for factory use only)

Part No. 24-10143-1183, Rev. B

Software Release 1.0

Issued April 2017

Refer to the [QuickLIT website](#) for the most up-to-date version of this document.

## Update Software

**Important:** A software update may be available for your device. Visit [VRFPro.com](#) or contact your nearest Johnson Controls representative for the latest version. Refer to the *VRF Smart Gateway User's Guide* (LIT-12012385) for instructions on applying updates.

## Applications

The Johnson Controls® VRF Smart Gateway enables the integration of the Hitachi VRF system with a building automation system (BAS), such as the *Metasys*® system. The VRF Smart Gateway performs this function by communicating between the native H-Link communications network of the Hitachi VRF system and the open building standard BACnet®/IP network. The VRF Smart Gateway intelligently provides the VRF device and point data over the BACnet/IP network in a way that the BAS can easily discover. The VRF Smart Gateway therefore requires little or no post-integration configuration within the BAS. The VRF Smart Gateway includes a simple web server that provides a wireless mobile user interface for configuring communication parameters and performing VRF system discovery and device naming.

The wireless connection on the VRF Smart Gateway allows users of a supported mobile device to be up to 30 m (100 ft, line of sight) away. Power must be supplied using the provided external power supply.

## North American Emissions Compliance

### United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the users will be required to correct the interference at their own expense.

#### RF Transmitters: Compliance Statement (Part 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

#### Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### RF Exposure (OET Bulletin 65)

To comply with FCC RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where there is at least 20 cm separation distance between the antenna and all persons.

## Canada

### Industry Canada Statement

The term **IC** before the certification/registration number only signifies that the Industry Canada technical specifications were met.

Le terme « IC » précédant le numéro d'accréditation/inscription signifie simplement que le produit est conforme aux spécifications techniques d'Industry Canada.

## Installation

### Parts Included

- VRF Smart Gateway
- Installation Instructions
- *VRF Smart Gateway Quick Start Guide (Part No. 24-10737-156)*

**Note:** A power adapter is available to order separately. Contact the nearest Johnson Controls representative to order.

### Special Tools Needed

The unit supports both DIN rail and surface mounting options. If the unit is permanently mounted to a vertical surface without a DIN rail, you need screws to mount the unit. The specific screw types depend upon the surface to which the unit is mounted. The screw holes on the VRF Smart Gateway can accommodate M3.5 and #6 screws.

To configure the VRF Smart Gateway using the gateway's Wi-Fi access point, you need a mobile device (tablet or smartphone) or computer (laptop or desktop) that supports Wi-Fi.

## Mounting

We recommend mounting the unit either vertically (upright and flush) or horizontally (sideways and flush). This flexibility allows the unit to be mounted in a way that minimizes spacial constraints and maximizes placement options for optimal wireless signal strength.

The unit should be mounted in such a way that labels can be read if they are visible. (For example, do not mount the unit upside down, which puts the labels upside down.)

## Location Considerations

Observe the following guidelines when mounting a VRF Smart Gateway:

- Mount the VRF Smart Gateway in areas free of corrosive vapors and observe the environmental limitations listed in the [Technical Specifications](#) section of this document.
- Objects (including ductwork, cabinets, doors, and glass) can impede the wireless signal. Minimize the number of objects between the connected computer or mobile device and the VRF Smart Gateway. Use line of sight, if possible.
- Metal objects (such as cabinet doors, enclosures, and pipes) and concrete objects (such as pillars, walls, and ceilings) may limit Wi-Fi service. To accommodate potential structural obstacles on site, the VRF Smart Gateway can be mounted flush against the wall or perpendicular to it.
- The VRF Smart Gateway is not rated for outdoor mounting.

## Mounting Locations

The VRF Smart Gateway can be attached to a 1-1/8 in. (35 mm) DIN rail or a flat, vertical surface. Mounting the unit on a ceiling or in a way that positions the front of the unit facing down is not recommended.

Although the unit has two mounting clips, only the bottom clip snaps inward. The top clip is permanently locked in the outward position, and it can be used as an additional hole for screwing the unit into place. If not utilized for DIN rail or surface mounting, the top and bottom clips may be removed from the unit.

### DIN Rail Mounting

To mount the unit on a DIN rail:

1. Securely mount a 3 in. (7.5 cm) or longer section of 1-1/8 in. (35 mm) DIN rail in the required space.
2. On the unit, pull the bottom mounting clip outward to the extended position.

**Figure 1: Positioning the Unit on a DIN Rail**



3. Hang the unit on the DIN rail by the hooks at the top of the DIN rail channel (on the back of the bracket), and position the unit snugly against the DIN rail.
4. Push the bottom-mounting clip inward to secure the unit on the DIN rail.

### Wall Mounting

The unit may be mounted using the holes in the DIN rail clips. This orientation helps accommodate on-site constraints. Screw hole locations are illustrated in [Figure 3](#).

The screw types needed to mount the unit depend upon the surface to which the unit is mounted. The screw holes on the VRF Smart Gateway can accommodate M3.5 and #6 screws.

For information on location considerations for maximizing signal strength, see the [Mounting](#) section.

**Figure 2: Sample Permanent Mounting, Back-side Screws**

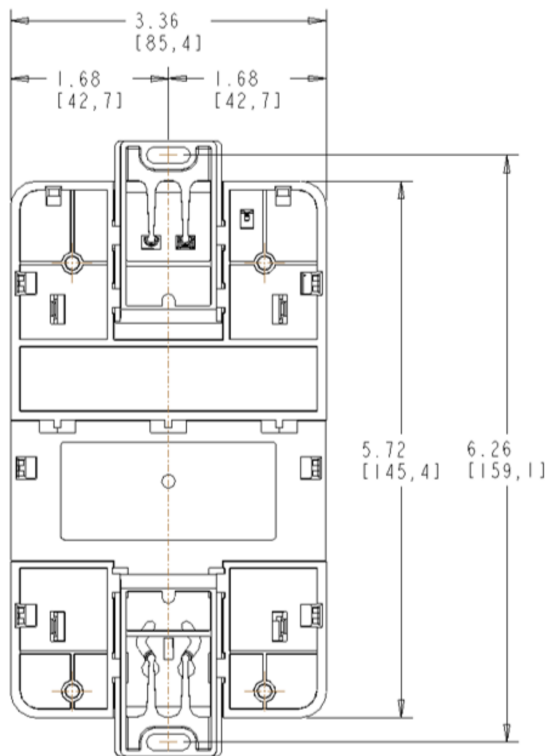


To mount the unit on a flat surface (such as a wall):

1. Pull the bottom mounting clip outward to the extended position.
2. Mark mounting hole locations on the wall using the dimensions shown in the following figure; or hold the bracket against the wall and mark the hole locations through the mounting clips.

**Note:** The position of the location holes depends on whether the bracket is mounted horizontally or vertically.

**Figure 3: Mounting Holes, Flat Mounting, DIN Rail Screws, in. (mm)**



**Note:** The screw holes on the VRF Smart Gateway can accommodate M3.5 and #6 screws.

3. Drill holes in the wall based on the locations marked in the preceding step, and insert wall anchors for each hole (if necessary).
4. Hold the unit in place, insert the screws through the mounting clips and into the screw holes, and then carefully tighten all screws.

**Important:** Do not overtighten the mounting screws. Overtightening the screws may damage the mounting clips or bracket.

## Wiring

### Wiring Consideration and Guidelines

Observe the following guidelines when wiring the VRF Smart Gateway:

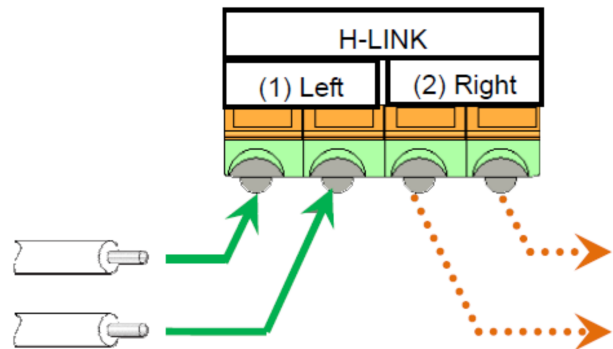
- Do not allow the VRF Smart Gateway to hang from a cable connection.
- Provide some slack in the cable between the VRF Smart Gateway and the controller or other device to which you are connecting.

## Wiring the H-Link Network

To wire the H-Link Network of the VRF Smart Gateway:

- Connect the two H-Link cable wires to the left terminals indicated in the following figure.
- If the VRF Smart Gateway is connected at an intermediate position of the H-Link network as opposed to the end of the network segment, use the right terminals shown in the following figure to continue the H-Link network.

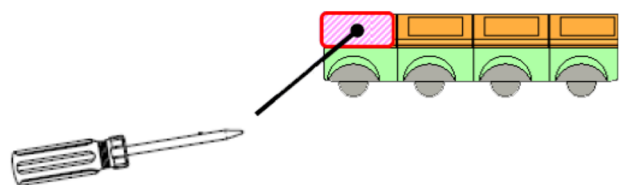
**Figure 4: H-Link Cable Insert Position**



To insert or remove the H-Link cable wires:

- Push the orange tabs using a small, flat screwdriver or similar tool as indicated in the following figure.
- Then, insert or remove the wire and release the tab.

**Figure 5: Inserting or Removing the H-Link Cable Wires**



## Ethernet Port

The Ethernet port on the VRF Smart Gateway is an 8-pin RJ-45 jack. The maximum allowable cable length is 328 ft (100 m). The Ethernet port on the VRF Smart Gateway connects to the BAS by using an Ethernet switch or similar networking equipment.

## External Power Supply Connections

To connect the VRF Smart Gateway using the supplied external power source:

1. Connect the 15 VDC output connector of the power supply to the power supply port of the VRF Smart Gateway.

### ⚠ CAUTION

**Risk of Property Damage.** Do not apply power to the system before checking all wiring connections. Short-circuited or improperly connected wires may result in permanent damage to the equipment.

#### MISE EN GARDE:

**Risque de dégâts matériels.** Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

2. Connect the power supply to the supplied power cord.
3. Plug the power cord into a 100 to 240 VAC outlet.

**Important:** Power should only be applied and removed by connecting and disconnecting the power cord from the 100 to 240 VAC outlet. Applying or removing power by connecting or disconnecting the 15 VDC connector can damage the unit.

### ⚠ WARNING

**Risk of Electric Shock.** Disconnect or isolate all power supplies before making electrical connections. More than one disconnection or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

#### AVERTISSEMENT:

**Risque de décharge électrique.** Débrancher ou isoler toute alimentation avant de réaliser un branchement électrique. Plusieurs isolations et débranchements sont peut-être nécessaires pour -couper entièrement l'alimentation de l'équipement. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

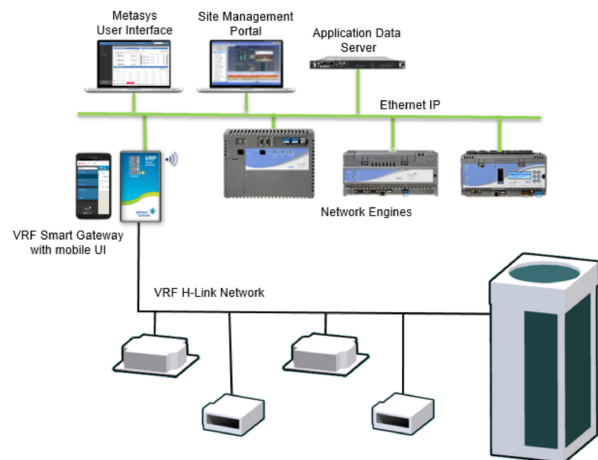
Figure 6: VRF Smart Gateway with Sample External Power Supply



## Operation

The easiest way to initially configure the VRF Smart Gateway is by connecting to the gateway's Wi-Fi network.

Figure 7: Connecting VRF Equipment to the Metasys System



## Connecting to the VRF Smart Gateway Wi-Fi Network

1. In the Wi-Fi settings of your device or laptop, connect to the VRF Smart Gateway Wi-Fi network using your default credentials. These credentials are included on a label in the *VRF Smart Gateway Quick Start Guide (Part No. 24-10737-156)* that came with your device.
2. Direct your browser to [www.myvrfsg.com](http://www.myvrfsg.com) to open the VRF Smart Gateway browser interface.

**Note:** VRF Smart Gateway ships with a private myvrfsg.com SSL certificate installed to ensure secure communication with the VRF Smart Gateway. However, this certificate does not indicate that it is trusted in a browser. If you wish to install your own certificate, refer to *Adding a Private Key and Certificate to VRF Smart Gateway* in the *VRF Smart Gateway Network and IT Guidance Technical Bulletin (LIT-12012341)*.

3. Read and accept the VRF Smart Gateway license agreement.
4. The first time you log in to the VRF Smart Gateway, the Change Password and Passphrase web page appears. You must change the Admin password and Wi-Fi passphrase.

**Important:** After you change the Wi-Fi passphrase or SSID, the web server restarts and you must rejoin the VRF Smart Gateway Wi-Fi network using the new passphrase. On some mobile devices, you must select and forget the original VRF Smart Gateway Wi-Fi network before rejoining the network with the new passphrase.

Change the default password in the **New Admin Password** field. Confirm the change by entering the new password in the **Verify New Admin Password** field.

Change the Wi-Fi Passphrase in the **New Wi-Fi Passphrase** field and click **Save**.

Once you have established Wi-Fi connection to the VRF Smart Gateway, you can begin to configure the gateway settings in the Settings menu as explained in the Users Guide. When the gateway is physically connected to the H-Link network, the VRF Smart Gateway automatically starts to discover the VRF system and devices. View the Device List from the VRF Smart Gateway UI to see the discovered VRF devices.

A software update may be available for your device. Visit [VRFPPro.com](http://VRFPPro.com) or contact your nearest Johnson Controls representative for the latest version. Refer to the *VRF Smart Gateway User's Guide (LIT-12012385)* for instructions on applying updates.

## Reset Button Operation and Descriptions

If you lose your password or if you want to restore the unit to factory defaults, the VRF Smart Gateway offers two reset functions: a **Network Reset** function that resets Wi-Fi and Ethernet settings, and a **Reset to Factory Defaults** function that resets all unit settings (including user-configured VRF equipment names and descriptions). Reset to Factory Defaults also resets your SSL certificate to the Johnson Controls self-signed certificate that is in the device when it comes from the factory.

For information on resetting the unit, see [Table 1](#).

**Important:** To use a unit that is reset to factory defaults, you must have the default login information supplied in the Quick Start Guide that shipped with the unit. The Reset to Factory Defaults function **does not** change the version of the application. If you did a software upgrade, the VRF Smart Gateway remains at the upgraded version rather than resetting to the version that it was running when it left the factory.

The reset button is on the side of the device, and it is embedded into the VRF Smart Gateway housing so that it cannot be activated by accident. To reach the reset button, use a paper clip, pin, or similar tool.

Notes:

- If you are connected to the network, using the reset button disconnects you.
- If you press the reset button for more than 9 seconds, the reset operation is cancelled.
- If a fault condition already exists, the reset button is disabled.



**Figure 8: Using the Reset Button**



**Table 1: Reset Button Operation and Descriptions**

Reset Function	Reset Operation <sup>2</sup>
<b>Reset Wi-Fi and Ethernet Settings</b>	<ol style="list-style-type: none"> <li>1. Press and hold the reset button for 2 seconds. The Fault LED displays Slow Flicker behavior.</li> <li>2. Release the reset button within 3 seconds. The Fault LED continues Slow Flicker behavior.</li> <li>3. Within 5 seconds, press the reset button again, and then immediately release it to confirm that you wish to reset Wi-Fi and Ethernet settings. (If you do not press the reset button to confirm within 5 seconds, the reset operation is cancelled.) The Wi-Fi (SSID and passphrase) and Ethernet settings are reset to factory defaults. The LEDs stop flickering for 2 seconds, and then the LEDs return to normal operation, based on the current state of the device.</li> </ol>
<b>Reset to Factory Defaults<sup>1</sup></b>	<ol style="list-style-type: none"> <li>1. Press and hold the reset button for 6 seconds. After 2 seconds, the Fault LED displays Slow Flicker behavior. This changes to Fast Flicker behavior after an additional 4 seconds of holding the reset button.</li> <li>2. Release the reset button within 3 seconds of seeing Fast Flicker behavior. The Fault LED continues Fast Flicker behavior.</li> <li>3. Within 5 seconds, press the reset button again, and then immediately release it to confirm that you wish to reset to factory defaults. (If you do not press the reset button to confirm within 5 seconds, the reset operation is cancelled.)</li> <li>4. All unit settings are reset to factory defaults. The LEDs stop flashing for 2 seconds, and then the LEDs return to normal operation, based on the current state of the device.</li> </ol>

<sup>1</sup> Resets all unit settings, including user profiles.

<sup>2</sup> For information on LED designations and flicker behavior, see [Table 2](#).

## Status Indication LEDs

The VRF Smart Gateway communicates status using LEDs to indicate the following functional states:

- power
- fault
- H-Link bus communication
- Ethernet communication
- Wi-Fi strength

See the following table for a comprehensive list of VRF Smart Gateway LED functional information.

## VRF Smart Gateway LED Designations and Descriptions

Table 2: LED Designations and Descriptions

LED Name	Color	Normal	Descriptions/Other Conditions
Power	Green	On Steady (no flashing)	Off = No power On Steady = Power supplied by primary voltage
Fault	Red	Off	Off = No faults/normal operation On Steady = Missing hardware, missing software, operating system has not yet initialized, or reset is in progress. Slow Flicker (1 blink in a second) = Software upgrade in progress Medium Flicker (2 blinks in a second) = Startup sequence Fast Flicker (5 blinks in a second) = Fault
H-Link Bus	Green	Flicker	Off = No data transmitting Flicker = Discovering VRF devices On Steady = Discovery complete

Table 2: LED Designations and Descriptions

LED Name	Color	Normal	Descriptions/Other Conditions
Ethernet	Green	On Steady	Off = Communication not established On Steady = Communication established Flicker = Data transmission
Wi-Fi	Yellow	On Steady	Off = No Wi-Fi signal or no devices currently connected over Wi-Fi Wi-Fi strength is indicated by the number of LEDs that are lit, with one lit LED indicating weak wireless signal strength (between 1% and 49%) and three lit LEDs indicating excellent wireless signal strength (at least 75%).

## LED Test Sequence at Startup

During startup, the VRF Smart Gateway automatically initiates a self-test to verify proper operation of the unit. Immediately after connecting supply power, the following LED lighting sequence occurs:

1. The Power LED turns on, and stays lit.
2. The Fault LED indicator flashes for approximately 40 seconds, then turns off when the VRF Smart Gateway is fully functional.
3. The Wi-Fi LEDs light up in succession (scanning), indicating that the VRF Smart Gateway is waiting for a device to join its Wi-Fi network.

## Repair Information

If the VRF Smart Gateway fails to operate within its specifications, replace it. The VRF Smart Gateway is not a serviceable product; however, it does support software updates to enable feature enhancements. For a replacement unit, software updates, or accessories, contact the nearest Johnson Controls representative.

Do not open the VRF Smart Gateway housing. The VRF Smart Gateway has no user-serviceable parts inside.



The VRF Smart Gateway does not require periodic field maintenance.

## Troubleshooting

**Table 3: Launch Issues Troubleshooting Information**

Problem	Resolution
You are not directed to the VRF Smart Gateway login page when you launch a web browser.	<p><b>Reason</b></p> <p>Device behavior can vary based on the device and Internet browser in use. For instance, some devices cache browser information and do not automatically redirect users to the VRF Smart Gateway login page when the browser is launched.</p> <p><b>Resolution</b></p> <p>Make sure that your device is connected to the VRF Smart Gateway's Wi-Fi network.</p> <p>Direct your browser to <a href="http://www.myvrfsg.com">www.myvrfsg.com</a>.</p> <p>If the login page is taking too long to load, try using the Ethernet connection instead.</p>
Every time I install the SSL certificate on my device, it asks me to re-install it. What should I do?	<p><b>Resolution</b></p> <p>Check your web browser settings and verify that cookies are enabled.</p>
When I install the SSL key or certificate, I receive the message Error Saving SSL Settings.	<p>When an SSL key or certificate is corrupted, the SSL page detects it and alerts you to the corrupted key or certificate.</p> <p>However, if the corruption is minor, for example, an extra space was copied while installing the certificate or a character was missed, the UI does not detect the problem and allows the corrupted key or certificate to be saved. The server detects the error and returns the <b>Error Saving SSL Settings</b> message. While this correctly prevents the bad key or certificate from being used, it does not inform you as to the source of the problem.</p> <p>In this case, reinstall the SSL key or certificate as described in the <i>VRF Smart Gateway Network and IT Guidance Technical Bulletin (LIT-12012341)</i>.</p>

Refer to the *VRF Smart Gateway User's Guide (LIT-12012385)* for information on Ethernet settings and SSL settings.

## Technical Specifications

**Table 4: VRF Smart Gateway**

<b>Product Code<sup>1</sup></b>	<b>SI-VRFCBN02-0Sx:</b> VRF Smart Gateway (Includes VRF Smart Gateway and 100 to 240 VAC power supply.)
<b>Power Consumption</b>	12 to 15 VDC at 5.2 W maximum
<b>Ambient Temperature Conditions</b>	<p><b>Operating:</b> 0 to 50°C (32 to 122°F)</p> <p><b>Operating Survival:</b> -30 to 60°C (-22 to 140°F)</p> <p><b>Non-Operating:</b> -40 to 70°C (-40 to 158°F)</p>
<b>Ambient Humidity Conditions</b>	<p><b>Storage:</b> 5 to 95% RH 30°C (86°F) maximum dew point conditions</p> <p><b>Operating:</b> 5 to 95% RH, 30°C (86°F) maximum dew point conditions</p>
<b>Transmission Power (Typical)</b>	<p><b>Wireless Local Area Network (WLAN) Transmission Power:</b></p> <p>CE Compliant levels</p> <p>+14.5 dBm, 54 Mbps</p> <p>+12.5 dBm, 65 Mbps</p>
<b>WLAN Receiver Sensitivity (Typical)</b>	<p>-76 dBm, 10% packet error rate (PER ), 54 Mbps</p> <p>-73 dBm, 10% PER, 65 Mbps</p>

**Table 4: VRF Smart Gateway**

<b>Transmission Speeds</b>	<p><b>Wireless Communication:</b></p> <p>2.4 GHz ISM bands, 802.11 b/g/n, 11/22/54 Mbps</p> <p>Channel 6 preconfigured, supported CH 1 to 11 for United States and Canada, and CH 1 to 12 for all other countries</p> <p><b>Serial Communication (H-Link Bus):</b></p> <p>9600 bps</p> <p><b>Ethernet Communication:</b></p> <p>10, 100 Mbps</p>
<b>Transmission Range (Typical)</b>	<p><b>Ethernet Communication:</b></p> <p>100 m (328 ft) cable length</p> <p><b>H-Link Bus Communication:</b></p> <p>1,000 m (3,280 ft) cable length</p> <p><b>Wireless Communication:</b></p> <p>30 m (98 ft) line-of-sight indoors</p> <p>91 m (299 ft) line-of-sight outdoors</p> <p>Channel 6 preconfigured, supported CH 1 to 11 for United States and Canada, and CH 1 to 12 for all other countries</p> <p><b>WLAN Range Performance:</b></p> <p>0 to 50 ft = Excellent</p> <p>50 to 100 ft = Good</p> <p>100 to 300 ft = Weakest, approaching out of range</p>
<b>Wireless Security</b>	<p>WPA2-PSK TKIP (Wi-Fi Protected Access Pre-Shared Key mode Temporal Key Integrity Protocol)</p> <p>WPA2-EAP-PEAP</p> <p>WPA2-EAP-TLS</p>
<b>Network and Serial Interfaces</b>	One H-Link port (4-pin port)
<b>Dimensions (H x W x D)</b>	145.4 x 85.4 x 40.1 mm (5.72 x 3.36 x 1.58 in. when used vertically)
<b>Weight</b>	<p>0.21 kg (0.46 lb)</p> <p><b>Note:</b> Weights do not include an external power supply.</p>
<b>Web Browser Requirements for Computers and Handheld Devices</b>	<p><b>Computer:</b></p> <p>Windows® Internet Explorer® 10 and Windows Internet Explorer 11, Apple® Safari® 6.1 and later, and Google® Chrome™</p> <p><b>Handheld Device:</b></p> <p>The handheld device must be running either Internet Explorer Mobile for Windows Mobile version 5 or version 6 operating system (OS); Apple® iPhone® and iPod touch® iOS version 7.0 or greater; Android™ 4.0.3, 4.0.4, and 4.1+, or Google Chrome. Other web browsers may display the UI, but the functionality is not guaranteed.</p>
<b>Purpose of Control</b>	Operating control
<b>Construction of Control</b>	Electronic Independently Mounted Control

<b>TYPE 1 or TYPE 2 Action</b>	TYPE 1
<b>External Pollution Situation</b>	Pollution Degree 2
<b>Rated Impulse Voltage</b>	330 V
<b>Ball Pressure Temperature</b>	100° C (212° F)
<b>Compliance</b>	<p><b>United States</b> UL Listed File E107041, ANSI/UL 60730-1, UL Standard for Automatic Electrical Controls for Household and Similar Use.</p> <p>Transmission Complies with FCC Part 15.247 Regulations for Low Power Unlicensed Transmitters</p> <p>Transmitter FCC Identification: OEJ-MAPWIFI</p> <p>FCC Compliant to CFR 47, Part 15, Subpart B, Class A</p> <p><b>Canada:</b> cUL Listed File E107041, CAN/CSA-E60730-1, Canadian Standard for Automatic Electrical Controls for Household and Similar Use</p> <p>Industry Canada IC: 279A-MAPWIFI</p> <p>IC: RSS-210, ICES-003</p> <p><b>Europe:</b> CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the RED Directive, the EMC Directive, and the Low Voltage Directive (LVD).</p> <p><b>CE Emission:</b> EN61000-6-3; Generic standards for residential, commercial, and light-industrial environments. ETSI EN 301 489-1, ETSI EN301 489-3 (Class 2), IEC 60730-1/ EN 60730-1</p>

*The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.*

The following table lists the indoor units (IDUs) as exposed by the VRF Smart Gateway.

BACnet Instance Number	Object Name	Object Description	Object Type		Contents of Information				
4	UNIT-CAP	Indoor Unit Capacity Code	AI	Value	0~255				
5	UNITEN-MODE	Unit Enable Mode	BO	Setting	Shutdown	Enable	–	–	–
6	SYSTEM-MODE	Command System Mode	MO	Setting	Cool	Dry	Fan	Heat	Auto
7	HtClg-REQ	Heat/Cool Required	BI	Status	False	True	–	–	–
8	SF-SPEED-C	Commanded Supply Fan Speed	MO	Setting	Low	Medium	High	Auto	–
9	EXPV-%	Expansion Valve Position	AI	Value	0.0~100.0%				
10	LIQ-PIPE-T	Liquid Pipe Temperature	AI	Value	-50~99°C / -58~210°F				
11	GAS-PIPE-T	Gas Pipe Temperature	AI	Value	-50~99°C / -58~210°F				
12	RA-T	Return Air Temperature	AI	Value	-50~99°C / -58~210°F				

**Table 5: VRF BACnet Points for Indoor Units**

BACnet Instance Number	Object Name	Object Description	Object Type		Contents of Information				
13	DA-T	Discharge Air Temperature	AI	Value	-50~99°C / -58~210°F				
14	DIFF-T	Coil Differential Temperature	AI	Value	-127~127°C / -260~260°F				
15	ZN-SP	Zone Temperature Setpoint	AO	Setting	17~30°C / 62~86°F				
16	RZN-T	Remote Zone Temperature	AI	Value	-50~99°C / -58~210°F				
17	COMP~REQ	Requested Compressor Speed	AI	Value	0~255 Hz				
18	UNIT-STOP-CODE	Unit Stop Code	AI	Value	0~255				
19	ALARM-CODE	Alarm Code	AI	Value	0~255				
20	RMT-OPT	Optional Room Thermostat	BI	Status	False	True	–	–	–
21	DEFROST-S	Defrost Status	BI	Status	False	True	–	–	–
22	REM-CON	Remote Control Connected	BI	Status	False	True	–	–	–
23	SF-S	Supply Fan Status	BI	Status	Off	On	–	–	–
24	ALARM-S	Unit Alarm Status	BI	Status	Normal	Alarm	–	–	–
25	SYSTEM-S	Actual System Mode	MI	Status	Cool	Dry	Fan	Heat	–
26	SF-SPD	Actual Supply Fan Speed	MI	Status	Low	Medium	High	–	–
27	ZN-T	Zone Temperature	AI	Value	-50~99°C / -58~210°F				
28	FILT-S	Filter Status	BI	Status	Clean	Dirty	–	–	–
29	FILT-S-RESET	Filter Status Reset	BO	Setting	Clean	Dirty	–	–	–
30	UNIT-LO	Unit Lockout	BO	Setting	Unlock	Lock	–	–	–
31	FANCMD-LO	Fan Command Lockout	BO	Setting	Unlock	Lock	–	–	–
32	SYSMODE-LO	System Mode Lockout	BO	Setting	Unlock	Lock	–	–	–
33	ZNSP-LO	Zone Temperature Setpoint Lockout	BO	Setting	Unlock	Lock	–	–	–
34	FANSPD-LO	Fan Speed Lockout	BO	Setting	Unlock	Lock	–	–	–
35	LOUVER-LO	Louver Position Lockout	BO	Setting	Unlock	Lock	–	–	–

The following table lists the IDU custom enum values for SYSTEM-MODE and SYSTEM-S.

**Table 6: IDU System Mode**

Metasys Enum Value	Metasys Enum String
1	Cool
2	Dry
3	Fan
4	Heat
5	Auto

The following table lists the IDU custom enum values for SF-SPEED-C and SF-SPD.

**Table 7: IDU Fan Speed**

Metasys Enum Value	Metasys Enum String
1	Low
2	Med

**Table 7: IDU Fan Speed**

<b>Metasys Enum Value</b>	<b>Metasys Enum String</b>
3	High
4	Auto

The following table lists the outdoor units (ODUs) as exposed by the VRF Smart Gateway.

**Table 8: VRF BACnet Points for Outdoor Units**

<b>BACnet Instance Number</b>	<b>Object Name</b>	<b>Object Description</b>	<b>Object Type</b>		<b>Contents of Information</b>		
3	ALARM-CODE	Alarm Code	AI	Value	0~255		
6	SYSTEM-MODE	System Mode	MI	Status	Heat	Cool	Auto
7	SYSTEM-S	System Status	MI	Status	Several Values (See the Following Tables for Custom Enum Information)		
8	HX-STATE	Heat Exchanger State	MI	Status	Several Values (See the Following Tables for Custom Enum Information)		
9	INV-STATE	Inverter State	MI	Status	Several Values (See the Following Tables for Custom Enum Information)		
10	FAN-STATE	Fan Controller State	MI	Status	Several Values (See the Following Tables for Custom Enum Information)		
11	INV-HRS	Inverter Compressor 1 Runtime	AI	Value	0~655,350 Hours		
12	COMP-HRS	Compressor 2 Runtime	AI	Value	0~655,350 Hours		
13	INV-FREQ	Inverter Compressor Frequency	AI	Value	0~255 Hz		
14	TOTAL-FREQ	Total Frequency	AI	Value	0~65,535 Hz		
15	FAN-%	Outdoor Fan Output	AI	Value	0~100%		
16	EXPV-%	Expansion Valve Position	AI	Value	0~100%		
17	BYPEXPV-%	Bypass Expansion Valve Position	AI	Value	0~100%		
18	DISCH-P	Discharge Pressure	AI	Value	0~3,698.5 psi		
19	SUCT-P	Suction Pressure	AI	Value	0~369.8 psi		
20	OA-T	Outside Air Temperature	AI	Value	-50~99°C / -58~210°F		
21	INV2ND-A	Inverter Compressor Secondary Current	AI	Value	0~127.0 A		
22	INVPRI-A	Inverter Compressor Primary Current	AI	Value	0~127.0 A		
23	COMP2-A	Compressor 2 Current	AI	Value	0~127.0 A		
24	INVTOP-T	Inverter Compressor Top Temperature	AI	Value	0~99°C / 32~210°F		
25	COMP2TOP-T	Compressor 2 Top Temperature	AI	Value	0~99°C / 32~210°F		
26	PROT-CODE	Protection Code	MI	Status	Several Values (See the Following Tables for Custom Enum Information)		
27	DEFROST-S	Defrost Status	BI	Status	Off	On	–
28	EMERGRUN-S	Emergency Run Status	BI	Status	Off	On	–

**Table 8: VRF BACnet Points for Outdoor Units**

BACnet Instance Number	Object Name	Object Description	Object Type		Contents of Information		
29	INV-S	Inverter Status	BI	Status	Stop	Run	–
30	FAN-S	Fan Status	BI	Status	Stop	Run	–

The following table lists the ODU custom enum values for SYSTEM-MODE.

**Table 9: ODU System Mode**

Metasys Enum Value	Metasys Enum String
1	Heat
2	Cool
3	Auto

The following table lists the ODU custom enum values for SYSTEM-S.

**Table 10: ODU System Status**

Metasys Enum Value	Metasys Enum String
1	Thermo off
2	Pump down
3	SW on start
4	Thermo on start
5	After defrost
6	Start control 1
7	Start control 2
8	Normal
9	Oil return
10	Defrost ready 1
11	Defrost ready 2
12	Differential pressure control
13	Defrost

The following table lists the ODU custom enum values for HX-STATE.

**Table 11: ODU Heat Exchanger Status**

Metasys Enum Value	Metasys Enum String
1	Evaporator Mode Low Pressure
2	Condenser Mode High Pressure
3	Evaporator Mode
4	Condenser Mode

The following table lists the ODU custom enum values for INV-STATE and FAN-STATE.

**Table 12: ODU Inverter and Fan Status**

Metasys Enum Value	Metasys Enum String
1	Normal stop
2	Fault



**Table 12: ODU Inverter and Fan Status**

<b>Metasys Enum Value</b>	<b>Metasys Enum String</b>
3	Over current
4	Fin temp
5	Electronic thermal
6	Undervoltage
7	Overvoltage
8	Communication error
9	Current sensor abnormality
10	Instantaneous power failure
11	Na0
12	MPU reset
13	Earth fault voltage
14	Phase loss
15	Na1
16	Driving prohibited area
17	Fan controller retry
18	Control abnormality
19	Na2
20	Na3
21	Loss of synchronism
22	Na4
23	Na5
24	Normal acceleration
25	Normal deceleration
26	Constant speed
27	Overload after the acceleration
28	Overload after the deceleration
29	Overload after constant speed
30	Power supply unbalance
31	Power supply phase loss
32	Na6

The following table lists the ODU custom enum values for PROT-CODE.

**Table 13: ODU Protection Code**

<b>Metasys Enum Value</b>	<b>Metasys Enum String</b>
1	Pressure ratio
2	Pd rise prevention
3	Current protection
4	INV module temp rise prevent
5	Compressor top overheat prevent
6	Ps drop or rise prevention

**Table 13: ODU Protection Code**

<b>Metasys Enum Value</b>	<b>Metasys Enum String</b>
<b>7</b>	Na1
<b>8</b>	Na2
<b>9</b>	Pd drop prevention
<b>10</b>	Current demand
<b>11</b>	Na3
<b>12</b>	Na4
<b>13</b>	Ps rise prevention

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