

Application

The BACnet® Router facilitates communication between BACnet/IP and BACnet MS/TP networks to monitor and control a wide variety of HVAC equipment, meters, fire alarm panels, and lighting on the Building Automation System (BAS).

Installation

Follow these guidelines when you install the BACnet Router:

- Transport the device in the original container to minimize vibration and shock damage to the router.
 - Verify that all the parts shipped with the device are present.
 - Do not drop the device or subject it to physical shock.
- **Important:** Do not open the BACnet Router housing for any reason. The device has no user-serviceable parts inside. Tamper-evident labels on the device caution installers, service technicians, building owners, and our RMA inspectors from unauthorized opening or tampering of the device.

Parts included

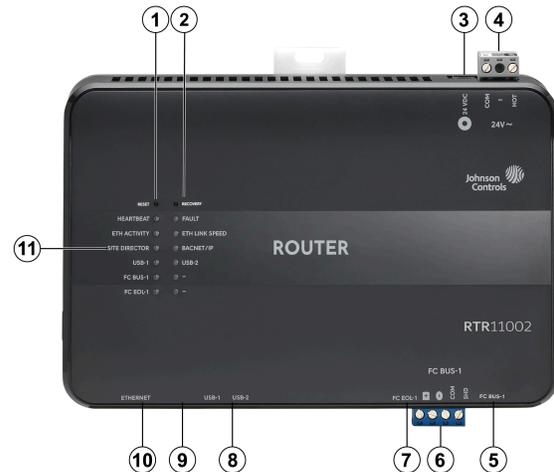
- One JC-RTR11002-0 BACnet Router
- One JC-RTR11002-0 BACnet Router Pack Sheet

Materials and special tools needed

- A wall mounting requires three M4 (#8) fasteners appropriate for the mounting surface.
- A DIN rail mounting requires one 19.0 cm (7.5 in.) or longer piece of 35 mm (1 1/8 in.) DIN rail and appropriate hardware.

Device diagram

Figure 1: BACnet Router device diagram



Callout	Description
1	Reset button. See Reset button .
2	Recovery button. See Recovery button .
3	Supply power adapter connection: 24 VDC barrel jack. See Power supply .
4	Supply power removable terminal block: gray terminals, 24 VAC, Class 2. See Power supply .
5	FC bus port: RJ-12 6-pin modular jack. The RJ-12 jack is a future enhancement.
6	FC Bus removable terminal block for FC BUS-1: blue terminal. See FC bus terminal blocks .
7	End-of-line (EOL) switch for FC BUS-1. See Setting end-of-line switches .
8	USB-1 and USB-2 ports are future enhancements.
9	Micro-USB port is a future enhancement.
10	One Ethernet port, 100/10 Mbps, 8-pin RJ-45 connector. See Ethernet port .
11	Multi-color LED status indicators. See LED status indicators .

Mounting

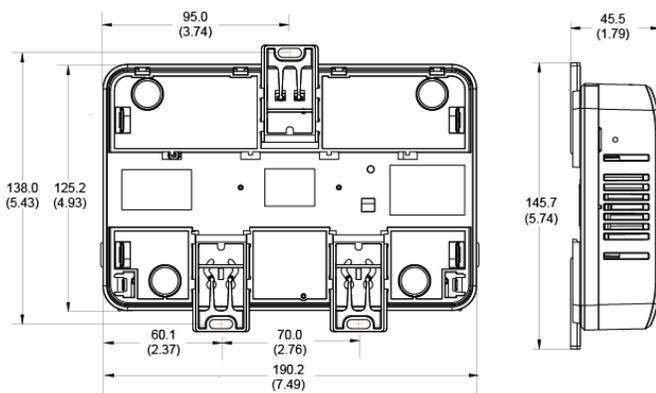
Location considerations

Follow these guidelines to mount the BACnet Router:

- Ensure that the mounting surface can support the router and any user-supplied enclosure.
- Mount the router in the proper orientation. Horizontal is preferred, but vertical is acceptable.
- Mount the router on an even surface in wall mount applications whenever possible.
- Mount the router in areas free of corrosive vapors and observe the environmental limitations listed in the [Technical specifications](#) section.
- Do not mount the router on surfaces that are prone to vibration, such as duct work, or in areas where electromagnetic emissions from other devices or wiring can interfere with router communication.
- Allow sufficient space for cable and wire runs and terminal connections.
- Mount the power supply above the router to ensure adequate heat dissipation and to position close to the power wiring conduit.
- Do not install the router in an airtight enclosure. Make sure the enclosure offers sufficient ventilation to ensure the temperature in the enclosure does not exceed 50°C (122°F).
- Mount the router so that the enclosure wall or the transformer does not obstruct ventilation of the router housing.

Dimensions

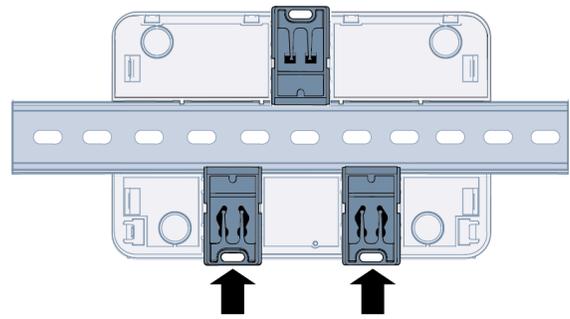
Figure 2: BACnet Router dimensions, mm (in.)



Mounting the BACnet Router for DIN rail mount applications

1. Securely mount a 19 cm (7 1/2 in.) or longer section of 35 mm (1 1/8 in.) DIN rail in the required space.
2. On the device, extend the two lower mounting clips.
3. Hang the top of the device to the DIN rail clip. Then press the device against the DIN rail and hold in place while you push up on the lower mounting clips to secure the device.

Figure 3: Rear view of the BACnet Router secured with mounting clips in latched positions



Mounting the BACnet Router for wall mount applications

Use the holes in the three mounting clips for wall mount applications. To mount the BACnet Router on a vertical surface, complete the following steps:

1. Pull the bottom two mounting clips downwards to their extended positions.
2. Mark mounting hole locations on the wall using the dimensions shown in [Figure 2](#), or hold the bracket against the wall and mark the hole locations through the mounting clips. The screw holes on the BACnet Router can accommodate M4 and #8 screws.
3. Drill holes in the wall based on the locations marked in Step 2. Insert wall anchors for each hole if necessary.
4. Hold the device 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 can crack the BACnet Router wall mount feet or housing.

Mounting the BACnet Router in a panel

To mount the BACnet Router in a panel, follow these requirements:

- Mount the panel in accordance with the manufacturer's instructions.
- Mount the device in the panel following the guidelines in the [Location considerations](#) and [Mounting](#) sections of this document.

Wiring overview

Power supply, network, and communication connections

See [Figure 1](#) for the location of the power supply terminal, network communication terminals, Ethernet port, and USB connections. All terminal blocks are removable.

This device can integrate to an MS/TP field controller (FC) trunk. The rules, guidelines, and wiring considerations for

the network or field bus application are provided in tables of this document.

Power supply

The device is powered with either a 24 VAC power transformer or a portable power adapter that supplies 24 VDC. In North America, use a Class 2, 24 VAC power supply with a 50 VA minimum output. Outside North America, use a 24 VAC SELV transformer at the appropriate rating. The minimum input voltage for the device to operate properly is 20 VAC.

Use a dedicated power supply to the device only. Do not connect any other loads to the power supply. Additional loads can cause noise interference.

Ethernet port

The Ethernet port is an 8-pin RJ45 network port to connect the device to Ethernet IP networks. The device can connect to Ethernet networks at 100 or 10 Mbps. The maximum cable length is 100 m (328 ft).

FC bus terminal blocks

The device has one Field Controller (FC) bus connection. These connections use a 4-pin removable, keyed terminal block that is labeled **FC BUS-1**.

The FC bus connections are isolated RS-485 ports that communicate at 2400, 9600, 19,200, 38,400, or 76,800 baud. You can use the FC bus port to integrate the BACnet MS/TP FC bus field controller network into the BAS system.

The SHD (shield) connections on the FC terminal blocks are not connected to any earth ground connection.

USB ports

The device features two USB 2.0 host (type A) ports and one micro-USB 2.0 client port. These ports are disabled and are for future enhancements.

Wiring

Mount the device securely before you wire it. For details, see [Mounting](#).

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.

Attention

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.

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.

WARNING

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.

- **Important:** Use this device only as an operating control. Where failure or malfunction of the device could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the device.

► **Important:** Utiliser ce appareil uniquement en tant que dispositif de contrôle de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du appareil risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du appareil.

► **Important:**

- Do not apply power to the device before you complete and check connections. Short circuits or improperly connected wires may result in permanent damage to the equipment.
- Use copper conductors only. Make all wiring in accordance with local, national, and regional regulations.
- The device is a low-voltage device. Do not exceed the device electrical ratings. If you apply a high voltage to the device, it voids any warranties and may result in permanent damage.
- Do not remove the terminal block keys. The terminal block plugs and the terminal sockets are keyed to fit together in the correct configuration only.
- Prevent any electrostatic discharge (ESD) to the device. Static electric discharge can damage the device and void any warranties.

Follow these guidelines when you wire the device:

- Route the supply power wires and communication cables at least 50 mm (2 in.) away from the vent slots in the sides of the device housing.
- Provide slack in the wires and cables. Keep cables routed neatly around the device to promote good ventilation, LED visibility, and ease of service.
- Ensure that the building automation network wiring meets the specifications, rules, and guidelines in [Wiring considerations and guidelines](#).
- Follow the transformer manufacturer's instructions and the project installation drawings. Power supply wire colors may be different on transformers not manufactured by Johnson Controls®.
- Verify that transformer phasing is uniform across the devices. Powering network devices with uniform 24 VAC supply power phasing reduces noise, interference, and ground loop problems.
- Do not connect the device to an earth ground connection.

Method for tightening terminal blocks

If you over-torque the terminal block screws during installation of the device, the pole gap in the terminal block may increase and create a loose connection. This can affect any of the terminal blocks. Torquing the terminal screws while the terminal blocks are attached to

the pin can damage the contact and can also cause loose connections.

To prevent over-torquing and damage to the contacts:

① **Note:** It is best practice to remove the connector block from the pin headers on the unit before wiring the terminal blocks. The best way to prevent any contact damage and loose connections is to avoid torquing the terminal screws while the plugs are attached to the pin headers.

1. If available, use a torque screwdriver to tighten the screw to .25 NM (2.212 in. lbs.). The recommended bit size for the universal screws on the terminal blocks is a slotted 1/8 in. (3 mm) bit.
2. If a torque screwdriver is not available, tighten the terminal screws until the screw is snug on wire, and then tighten the screw an additional quarter (90°) to half (180°) turn.

① **Note:** The design of the terminal block screw helps to prevent over torque. Do not attempt to tighten by using more down force than necessary.

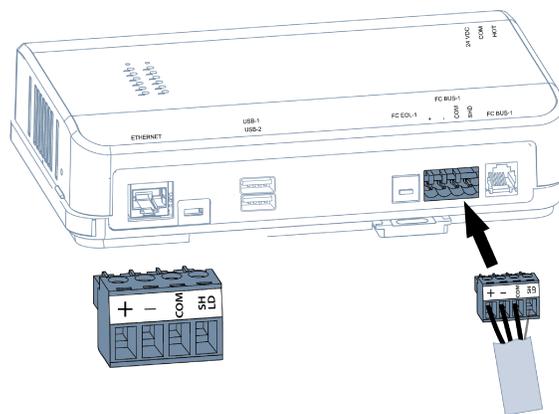
Connecting MS/TP devices

Supported field bus integrations include BACnet MS/TP bus. The device has one field bus connection.

1. Connect the 3-wire bus cable to the removable 4-terminal plugs labeled **FC BUS-1** as shown in [Figure 4](#).

① **Note:** The FC bus terminal blocks on the device are blue.

Figure 4: FC bus terminal blocks and wiring connections

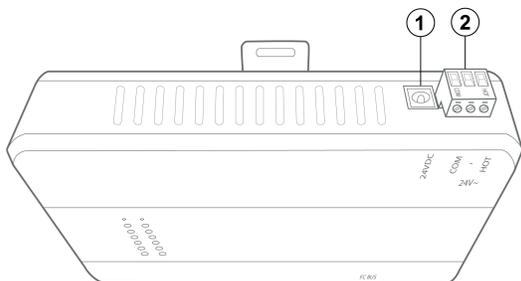


Connecting the power source

To terminate the power connection to the device, complete the following steps:

1. Connect power to the device according to the power source you use:
 - If you use a 24 VAC power transformer, connect the 24 VAC supply power wires from the transformer to the removable power terminal block plug on the device, see callout 2 in [Figure 5](#). The connections are **HOT** and **COM** (common). Insert the plug.
 - ⓘ **Note:** Power supply wire colors can be different on transformers not manufactured by Johnson Controls. Follow the transformer manufacturer's instructions and the project installation drawings.
 - If you use the 24 VDC power adapter, plug the power adapter into the round **24 VDC** barrel plug located in the upper right corner of the device. See callout 1 in [Figure 5](#). Connect the 24 VDC power adapter to 120 VAC.
 - ⓘ **Note:** Do not use both the power terminal block and the power adapter. Select either one.

Figure 5: Supply power wiring: 24 VAC transformer or 24 VDC adapter



Callout	Description
1	Barrel plug for 24 VDC power adapter
2	Terminal block plug for 24 VAC power transformer

2. Go to [Setting end-of-line switches](#).

Setup and adjustment

The following sections describe the setup and adjustment of the device.

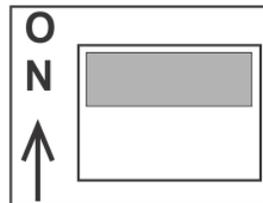
Setting end-of-line switches

The network devices at each end of an FC bus segment must be set as network terminated devices. The device has one EOL switch for each of its FC bus connections that

sets the device as a network terminated device on the bus.

To set a device as an FC bus terminated device, position the switch on the EOL switch block to the **ON** position as shown in the following figure.

Figure 6: FC bus EOL switch in the factory default ON (up) position



- ⓘ **Note:** The device is shipped with each EOL switch in the initial factory position, **ON** as shown in [Figure 6](#). If the device is not a terminated device on the FC bus, reposition the switch on the EOL switch block to the Off (down) position.

Set the EOL switches appropriately for FC Bus-1. The device follows the same rules as other switch-terminating devices listed in the *Setting Terminations* section of the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

For the RS-485 connection, set the EOL termination to ON, or install an EOL terminator, for the two devices located at either end of each bus segment on an RS-485 bus. Set the EOL switch to off, or do not install an EOL terminator, for all other devices on the bus segment on an RS-485 bus.

Powering on the device

Apply power to the device. After you apply power, the device requires approximately three minutes to start up and become operational. See [LED test sequence at startup](#).

Startup is complete and the device is operational when the heartbeat LED flashes purple and the fault LED is off. The various LEDs are shown in [LED status indicators](#).

Disconnecting power from the device

Disconnect power from the device by removing the terminal block plug from the power terminal port on the device, as shown in [Figure 5](#), or disconnecting the power adapter cable.

When you disconnect or lose supply power from the device, the device becomes nonoperational when the power management settings expire. The heartbeat LED, as shown in [Figure 7](#), remains on (blue), and the super capacitor powers the device for approximately 30 seconds in order to back up volatile data in nonvolatile memory. The heartbeat LED goes off when the data backup is complete.

- ① **Note:** The behavior of the super capacitor is different from backup batteries that devices used in the past. For example, the capacitor requires time to recharge after each power cycle. The unit is not designed for frequent power cycles over a short period of time, such as three or four power cycles in one hour. In this scenario, the capacitor can deplete enough so that it no longer functions. A fully depleted capacitor can take up to 90 minutes to recharge after the device is plugged into its power source.

Commissioning

Use System Configuration Tool (SCT) to configure the BACnet Router. Refer to *SCT: System Configuration Tool Help (LIT-12011964)* for detailed information.

Logging on to the BACnet Router

1. To log on to the BACnet Router UI, go to `https://<BACnet Router IP address>/UI`.

- ① **Note:** To determine the IP address of the BACnet Router, log on to SCT Pro. In the **Utilities** area, click **Discover**. From the **Network Interface** list, select the Ethernet connection option. Click **Discover**. The device discovery returns information about the BACnet Router that includes the IP address.

2. Enter your username and password. If this is the first time you log on, enter the default username and password. The UI prompts you to change the username and password.
3. On successful log on, you see the navigation tree that includes the BACnet Router device object. To verify that the objects listed for the BACnet Router are correct, expand the database. The navigation tree contains the following objects:
 - Site
 - User Views
 - Summary Definitions
 - BACnet Router Device Object
 - BACnet Protocol Eng
 - Eth IP DataLink
 - Update
 - Memory Usage Trend Log
 - ETH1 Comms Quality Trend Log
 - Total Power Transition Trend Log

Configuring the initial BACnet Router settings

1. In the BACnet Router UI, click the BACnet Router object in the navigation tree. In the **Focus** tab, in the **MSTP** section, ensure the **Remote Network Addr** matches the remote field bus configured network address, which is on the **Hardware** tab of the remote field bus of the supervisory device.

- ① **Note:** The **Remote Network Addr** and the remote field bus configured network address must be unique and they must match each other.

2. **Optional:** If you are configuring a static IP address, go to the **Network** tab. Under **LAN**, change **DHCP Enabled** to **False**. Adjust the **IP Router Address**, the **IP Mask**, and then the **JCI IP Address**.

- ① **Note:** You must edit the attributes in this order.

Configuring the network number

About this task:

By default, the network number of the supervisory device and BACnet Router are the same. If you configured the network numbers, note that the network number of the supervisory device and the BACnet Router must be the same. Use the following steps to set the network number of the BACnet Router.

1. In the navigation tree, select the BACnet Router object.
2. Select the **Eth IP DataLink** object.
3. In the **Detail** tab, under the **Setup** section, enter the network number of the supervisory device in the **Pending Network Number** field.
4. Click the tick button to confirm.
5. Click the BACnet Router object.
6. Click **Command**.
7. From the **Command** list, select **Activate Changes**.
8. From the **Value** list, select **Update All Changes Pending Attributes and Restart Device**.
9. Click **SAVE**. The device restarts. When the device comes back online, the Configure Network Number is updated.

Configuring the UDP port number

About this task:

By default, the UDP port of the supervisory device and BACnet Router are the same. If you configured the UDP port number, note that the UDP port of the supervisory device and the BACnet Router must be the same. Use the following steps to set the UDP port number of the BACnet Router.

1. In the navigation tree, go to the BACnet Router object.
2. Click the **Eth IP DataLink** object.
3. In the **Focus** tab, under the **Network** section, specify in the **BACnet IP UDP Port** field the same number as the supervisory device's UDP port number.
4. Click the tick button to confirm.
5. Click the BACnet Router object.
6. Click **Command**.
7. From the **Command** list, select **Activate Changes**.
8. From the **Value** list, select **Update All Changes Pending Attributes and Restart Device**.

9. Click **SAVE**. The device restarts. When the device comes back online, UDP port number is updated.

Configuring the BACnet MS/TP integration

1. In the supervisory device's UI, click the plus icon on the upper left of the navigation tree.
2. In the **Create Item** window, from the **General Type** list, select **Integration**.
3. From the **Object Type** list, select **Field Bus MSTP**.
4. In the **Unique Identifier** field, enter a unique name or accept the default.
5. Click **NEXT**.
6. In the **Hardware** tab, ensure **Trunk Number** is 3 or greater.
7. In the **Configured Network Number** field, enter the network number of the supervisory device.
8. Click **CREATE**. The integration object appears in the network tree.

Adding a field device

1. Select the new field bus MS/TP integration from the navigation tree of the supervisory device
2. Click the plus in the upper left of the navigation tree. The **Create Item** wizard opens.
3. From the **General Type** drop-down list, select **Field Device**. **Discovery** is selected by default.
4. Modify the integration attributes as appropriate.
5. Click **DISCOVERY**. Wait for the discovery to finish.
6. Select the devices that you want to add to the remote field bus integration.
7. Review and configure the selected devices as appropriate.
8. Click **CREATE**.

Adding a field point

1. From the navigation tree of the supervisory device, select the new field device object.
ⓘ Note: The maximum number of field points in a folder or directly under a field device is 1000. To add more than 1000 field points to a field device, or to organize your field points within folders under a field device, create the folders before adding the field points. Select the desired target folder when you create the field points.
2. Click the plus icon in the upper left of the navigation tree. The **Create Item** wizard opens.
3. From the **General Type** drop-down list, select **Field Point**. **Discovery** is selected by default.
4. Click **DISCOVERY**.
5. When the discovery is complete, select the points that you want to add to the field device by clicking or tapping the check boxes.
6. Click or tap **NEXT**.

7. Review and configure the selected field points as appropriate. For example, you can add alarm and trend extensions to the points by selecting the check box with the alarm icon or the check box with the trend icon, respectively.

ⓘ Note: On a site with an engine at version 9.0, you may get an error when you add more than 20 alarm and trend extensions. If this occurs, reduce the number of extensions that you want to add in one batch and add the remaining extensions in another batch.

8. Click or tap **CREATE**.

Configuring the BACnet Router as a BBMD

About this task:

If a BACnet Router is on an IP subnet by itself, you need to configure a BACnet Broadcast Management Device (BBMD). If the BACnet Router is on an IP subnet with an engine, you do not need to configure a BBMD.

1. In the navigation tree of the site director's UI, select the Site object.
2. In the **Details** tab, under the **BACnet** section, click **Third party BBMDs**.
3. In the **Third party BBMDs** window, use the plus icon in the upper left to add devices.
4. Click the + sign to add a row. Then, in the **Address-IP** field of the new row, enter the device's IP address.
5. In the **Address-UDP Port** field, enter the device's UDP Port number.
ⓘ Note: This is the BACnet IP UDP Port number that can be found in the Eth IP DataLink object's **Focus** tab under the **Network** section.
6. Enter the **IP Broadcast Mast**. In most cases, the address is 255.255.255.255.
7. Click **SAVE**. Both the engine's and the BACnet Router's subnets do a discovery on each network.

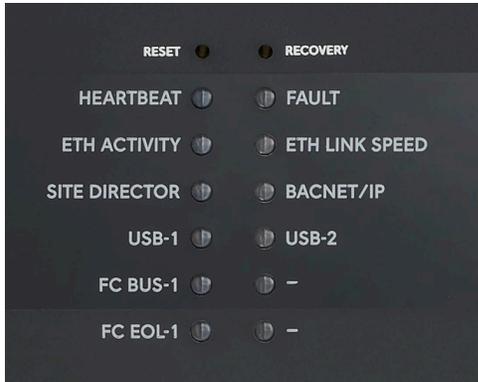
Troubleshooting

The following sections include information on how to troubleshoot your device.

LED status indicators

LEDs on the front panel of the device indicate its functional state. For a comprehensive list of LED functional information, see [Figure 7](#) and [Table 1](#).

Figure 7: Device LED designations



LED test sequence at startup

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

- The **HEARTBEAT** LED flashes blue or purple when the device starts.
- The **FAULT** LED is solid red for approximately 30 seconds, then turns off.
- The **USB-1** and **USB-2** LEDs are inactive.

LED indication table

The following table describes the meanings of each LED on the device. A flicker has a fast blink rate that is faster than one second, whereas a flash has a much slower blink rate of one second or more.

Table 1: LED designation, normal status, description, and other conditions

LED name	Color	State	Description
HEARTBEAT	Multicolor: blue or purple	Flashing blue and purple	1 blink per second = The device is in operation. All monitored processes have started and the device is fully operational.
		On, blue	On solid, no blink = The device has power but is not operational
		Medium flicker, purple and blue	2 blinks per second = Device start up in progress
		Fast flicker, purple and blue	5 blinks per second = Device shut down in progress
		Off	No power
FAULT	Red	Off	The device is in normal operation
		On	On steady = Diagnostics are running or fault conditions are detected, for example, excessive memory or flash usage, or high CPU temperature.
ETH ACTIVITY	Green	Flickering	1 blink per second = Data transmission over the Ethernet connection. Ethernet traffic is general traffic, may not be for the device.
		Off	No communication
ETH LINK SPEED	Yellow	On	On steady, yellow = Network connection of 100 Mbps
		Off	No network connection or if ETH ACTIVITY light is flickering, network connection of 10 Mbps
SITE DIRECTOR	Green	On	The device is always recognized as a Site Director.
BACNET/IP	Green	Flashing	1 blink per second = The device is transmitting BACnet messages over BACnet/IP to other devices.
		Off	No communication with other BACnet/IP devices
USB-1	Disabled		
USB-2	Disabled		
FC BUS-1	Green	Flashing	1 blink per second = data transmission with normal communication over FC BUS-1
		On	Devices are defined on FC BUS-1, but none are communicating. Only the device is transmitting.
		Off	No data transmission

Table 1: LED designation, normal status, description, and other conditions

LED name	Color	State	Description
FC EOL-1	Yellow	On if connected	On steady = end-of-line termination is set to on for FC BUS-1
		Off if not connected	Off steady = end-of-line termination is set to off for FC BUS-1

Reset button

The device features a recessed Reset button that is located directly above the Heartbeat LED. If you need to reset the device but retain the archive, issue a Reset Device command from the user interface. This type of reset is known as a soft reset.

To force an immediate restart of the device and a reset of the processor, press and immediately release the Reset button with an extended paper clip or mini screwdriver. This action is otherwise known as a hard reset or processor reset.

- ① **Note:** Press the Reset button **only** if the device fails to respond and cannot be accessed by any user device. Do not press the Reset button unless you have tried other reasonable means to fix the problem.
- ① **Note:** The device has a super capacitor that, when charged, keeps the unit running for up for 30 seconds after it loses power.

Recovery button

Use the Recovery button to recover device functionality. You can use this button to reset the device to a known state if its operation becomes unreliable and cannot be fixed with standard procedures.

Use this button to resolve the following type of conditions:

- Forgotten password
- Device restarts continuously
- Device is unresponsive
- Device is unable to successfully download code from SCT

- ① **Note:** The device has an active partition and an inactive partition. The firmware version on the inactive partition may be older than the version on the active partition and may lack the security enhancements of the newer, active partition. If the Recovery button is pressed to change partitions, it is possible that the older firmware may revert to the older recovery button behavior. To check which release is installed on the active partition, press the Recovery button and release after **1 second**. If this has no effect, the newer firmware version is active and behaves as described below. If this initiates the recovery sequence, the older version is active and exhibits older Recovery button behavior.

Recovery to same partition

You must press the Recovery button continuously for **5-10 seconds**. After **5 seconds** the fault LED will start blinking once every second, which is the indicator to release the Recovery button to invoke the same partition recovery. When released, the Heartbeat LED is solid **ON**. To apply same partition recovery, release the button before **10 seconds**. The following events occur:

1. Reverts to factory default archive.
2. Defaults the devices's hostname to SNE and MAC address.
3. Defaults the IP address to DHCP.
4. Reverts to the factory default security database. Recovery is complete when the Heartbeat LED starts to blink at **1 second** intervals.

Recovery to inactive partition

You must press the Recovery button continuously for at least **10 seconds**. After **10 seconds** the fault LED blinks once every **5 seconds**, which is the indicator to release the Recovery button to invoke inactive partition recovery. When released, the Heartbeat LED is solid **ON**. Do **not** release the button before **10 seconds** to invoke inactive partition recovery. The following events occur:

1. Reverts to factory default archive.
2. Defaults the device's hostname to SNE and MAC address.
3. Defaults the IP address to DHCP.
4. Reverts to the factory default security database.
5. Runs on the opposite partition, possible with a different installed release. Recovery is complete when the Heartbeat LED starts to blink at **1 second**.

- ① **Note:** To determine which partition is currently active, open the user interface and locate the device's Update folder. Under the Status section, the Active System Partition attribute shows A for partition 0 or B for partition 1.

Wiring considerations and guidelines

Table 2: Router Ethernet network rules

Category	Rules and maximums allowed
General	Star topology with network switches
Number of MS/TP devices	Maximum of 100 devices at one site in the network. Limited to 32 devices for a Remote Field Bus.
Line length and type	2,000 m (6,600 ft) for plastic/glass fiber optic with external adapter
	100 BaseT: 100 m (330 ft) Cat5 or Cat6 cable 10 BaseT: 100 m (330 ft) Cat5 or Cat6 cable
Terminations	For 100/10 BaseT

Table 3: Guidelines for BACnet protocol MS/TP network topology

Category	Rules and maximums allowed
General	RTR1100x model supports one BACnet MS/TP field controller (FC) trunk Field controller trunks are wired with a daisy chain topology only.
Number of devices	100 devices per FC Bus with no more than two repeaters between any device and a maximum of 50 devices between repeaters; one FC Bus model does not support the N2 Bus trunk. Limited to 32 devices for a Remote Field Bus.
Line length and type	1,500 m (5,000 ft) cable without a repeater
	4,500 m (15,000 ft) cable from the device to the farthest FC Bus device (three bus segments of 1,500 m [5,000 ft] each, separated by repeaters)
	2,000 m (6,600 ft) between two fiber modems
	Use a 6 mm (0.250 in.) wire strip
Cable type	Stranded 0.6 mm (22 AWG) 3-wire twisted, shielded cable is recommended. Stranded 0.6 mm (22 AWG) shielded 4-wire (two twisted-pairs) shielded cable is acceptable. ⓘ Note: The + and - bus leads should be a twisted pair. On applications using 4-wire (two twisted-pairs) cable, isolate and insulate unused conductor. Refer to the <i>MS/TP Communications Bus Technical Bulletin (LIT-12011034)</i> for more information.
Terminations	FC devices with EOL switch in the ON position, one at each end of each FC Bus segment

Technical specifications

Table 4: JC-RTR11002-0 BACnet Router technical specification

Specification	Description
Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), SELV power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum) Alternate: Dedicated nominal 24 VDC, Class II power supply input; North America: ACC-PWRKIT-1A24; Europe: ACC-PWRKIT-1E24
Power consumption	38 VA maximum
Operating system	Wind River® Linux LTS 19 (LTS: long-term support)
Processor	NXP i.MX6 DualLite processor, dual core Cortex-A9 processor at 1.0 GHz with 512 KB of L2 cache
Memory	16 GB flash nonvolatile memory for operating system, configuration data, and operations data storage and backup 2 GB SDRAM for operations data dynamic memory
Supported integrations	BACnet/IP, BACnet MS/TP

Table 4: JC-RTR11002-0 BACnet Router technical specification

Specification	Description
Network and serial interfaces	One Ethernet port: 100/10 Mbps, 8-pin RJ45 connector One FC port: RJ12 6-pin port, connects with 1.5 m (4.9 ft) RJ12 field bus cable One galvanically isolated RS-485 port, with a removable 4-pin terminal block Three USB ports: one Micro-B port and two USB A ports. All USB ports are currently inactive.
Transmission speeds	Ethernet communication: 100 Mbps or 10 Mbps The device can reside and interoperate on a 1 Gbps network, but does not itself connect at 1 Gbps. Galvanically isolated, serial communication (FC bus): 76,800 bps, 38,400 bps, 19,200 bps, 9600 bps, or 1200 bps (selectable)
Ambient temperature conditions	Operating: 0°C to 50°C (32°F to 122°F) Non-Operating: -40°C to 70°C (-40°F to 158°F)
Ambient humidity conditions	Storage: 5% to 95% RH, 30°C (86°F) maximum dew point conditions Operating: 10% to 90% RH, 30°C (86°F) maximum dew point conditions
Housing	Black polycarbonate and acrylonitrile butadiene styrene (ABS) blend IP protection class: IP20 UL flammability rating: UL94-5VB
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (height x width x depth)	190 mm x 125 mm x 44.5 mm (7.48 in. x 4.92 in. x 1.75 in.)
Weight	0.387 kg (0.852 lbs)
Compliance	United States: UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment; FCC Compliant to CFR47, Part 15, Subpart B, Class A, Conformance to FIPS 140-2 Level 1 using FIPS validated components.
 Note: This compliance applies to the JC-RTR11002-0 BACnet Router only. For Control Panel Assembly, you must adhere to local regulations and compliance requirements for your application.	
	Canada: UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada Compliant, ICES-003
	Europe: CE Mark – Johnson Controls, Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.
	Australia and New Zealand: RCM Mark, Australia/NZ Emissions Compliant
	BACnet Testing Laboratories™ (BTL) Listing Pending
	FIPS 140-2 Level 1: Compliant using FIPS validated components
	United Kingdom: Johnson Controls declares that this product is in compliance with Electromagnetic Compatibility Regulations, The Electrical Equipment (Safety) Regulations, and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations.

Table 5: JC-RTR11002-0 BACnet Router Standard Control Panel Assembly technical specifications

Specification	Description
Part number	P2ABN-JB001NA3
Enclosure rating	NEMA 1
Enclosure finish	ANSI 61 gray polyester powder coating
Ambient operating condition	0°C to 50°C (32°F to 122°F) 10% to 90% RH 30°C (86°F) maximum dew point conditions

Table 5: JC-RTR11002-0 BACnet Router Standard Control Panel Assembly technical specifications

Specification	Description
Dimensions (height x width x depth)	20 in. x 16 in. x 6.50 in. (406 mm x 508 mm x 165 mm)
Panel weight	45 lbs (20.4 kg)
Ambient storage condition	5% RH to 95% RH 30°C (86°F) maximum dew point conditions
Agency compliance	Control Panel: UL 508A Rated (cULus listed); Enclosure UL 50 Rated, cUL-CAN/CSA C22.2 No. 14-05, HCAI Special Seismic Certification Preapproval: OSP-0140-10 California Building Code (CBC) - 2013, International Building Code (IBC) - 2012 Seismic Performance Characteristics: $S_{Ds}(g) = 2.26$, $z/h = 1.0$, $I_p = 1.5$

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.

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.

Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Industry Canada Statement(s)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

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

Patents

Patents: <https://jciapat.com>

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Repair information

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

Do not open the device housing. A tamper-evident label indicates if the unit was opened. The device has no user-serviceable parts inside and does not require periodic field maintenance. A non-replaceable super capacitor, not a battery, retains device data during a loss of power.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Single point of contact

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