WNC1800/FX-ZFR182x Pro Series Wireless Field Bus System Catalog Page

Johnson Controls

Description

The WNC1800/FX-ZFR182x Pro (FX-ZFR Pro) Series Wireless Field Bus System provides a wireless platform for all FX-PC family and TEC3000 Thermostat Controllers (TEC) family controllers using BACnet® protocol over the 2.4 GHz wireless ISM band.

Pairings of a FX-ZFR1821 or FX-ZFR1822 Pro Router and any FEC family device or a wireless TEC3000 model (with built-in router) are referred to as Wireless-Enabled Programmable Controllers (WEPCs). An FX-PC family device is an FX-PCA, FX-PCG, FX-PCX, or FX-PCV controller.

A FX-ZFR Pro Series system can consist of the following items:

- Wireless Network Coordinators (WNC) Gateways
- FX-ZFR1820 or FX-ZFR1823 Pro Coordinator Radios
- TEC3000 Wireless Thermostat Controllers
- FX-ZFR1821 or FX-ZFR1822 Pro Routers connected to FX-PC Family devices or acting as repeaters
- FX-WRZ Series Wireless Room Sensors

ⓘ **Note:** Repeaters extend the wireless transmission distance of the BACnet data communications, fill in any gaps within the wireless mesh network, and provide alternate wireless data transmission pathways.

Together, these components create a wireless mesh network that allows the exchange of data between the collection of WNC Gateways, WEPCs, TEC3000s, and FX-WRZs within the FX-ZFR Pro Series system's wireless network and a network engine using standard BACnet IP communications.

The wireless mesh network enhances reliability by providing redundant transmission paths for the data through other routers in the mesh network. The result is a resilient, self-healing network.

Features

- Wireless Communications for a Wireless Mesh Network
- Improved Application Mobility and Flexibility
- Support of up to Nine FX-WRZ Series Wireless Room Sensors per Wirelessly Enabled Field Controller
- Multiple Diagnostic Light-Emitting Diodes (LEDs) and display icons
- Compact, Easy-to-Install, and Integrate Wireless Hardware

Applications

The wireless products within an FX-PC system are ideal for any location where it is cost-prohibitive, difficult, or aesthetically unappealing to hardwire between devices. Examples include the following locations:

- Hospitals, office buildings, university campuses, educational facilities, correctional facilities, and other commercial structures with brick or solid concrete walls, ceilings, or both that impede hard-wired applications
- Office buildings, retail stores, and other commercial real estate where tenant turnover is frequent and temporary walls and ceilings are common
- Museums, historical buildings, atriums, and other sites where building aesthetics and historical preservation are important

- Stadiums, arenas, gymnasiums, convention centers, airports, zoos, and other locations with large, open spaces wood veneer, or other decorative surfaces that present challenges to hardwiring

- Buildings with asbestos or other hazardous materials that must not be disturbed

- Buildings with occupants sensitive to business disruptions

- Regions with high labor costs

The FX-ZFR Pro Series System is approved by national compliance agencies for use in the United States and Canada. See the Technical specifications table in this document.

Locations or applications that prohibit cellular telephones or Wi-Fi systems are unsuitable for the wireless FX-PC products.

Do not use the wireless products in applications that cannot tolerate intermittent interference or where the following may occur:

- Critical control features would affect life safety or result in large monetary loss, including secondary (backup) life-safety applications

- Data centers, production lines, or critical areas would be shut down

- Loss of critical control would result from loss of data from humidity or temperature sensor communications

- Operation of exhaust fans or Air Handling Units (AHUs) would impair a purge or pressurization mode

- Missing data would invalidate reporting required by the customer

- Security points are monitored

Repair information

If a WNC1800/FX-ZFR182x Pro Series Wireless Field Bus System component fails to operate within its specifications, replace the unit. For a replacement WNC1800/FX-ZFR182x Pro Series Wireless Field Bus System component, contact the nearest Johnson Controls® representative.

Selection charts

Table 1: WNC1800/FX-ZFR182x Pro Series Wireless Field Bus System components

Code number	Description
FX-WNC1820-0A	The FX-WNC1820-OA kit is comprised of the following components: • WNC Gateway and mounting base with 110/220 VAC Power Supply • The FX-ZFR1820 Pro Coordinator Radio with 3-Foot RJ-12 connecting cable • Box mount for FX-ZFR1820 Pro Coordinator Radio
FX-WNC1823-0A	The FX-WNC1823-OA kit is comprised of the following components: • WNC Gateway and mounting base with 110/220 VAC Power Supply • The FX-ZFR1823 Pro Coordinator Radio with 10-Foot RJ-12 connecting cable • Mounting screws for FX-ZFR1823 Pro Coordinator Radio ⓘ **Note:** A field-provided ceiling clip is required to mount the ZFR1823 Pro Coordinator Radio **below** grid ceilings.

Table 1: WNC1800/FX-ZFR182x Pro Series Wireless Field Bus System components

Code number	Description
FX-ZFR1821-0B	The FX-ZFR1821-0B kit is comprised of the following components: • FX-ZFR1821 Pro Router, EMT mount, with 3-Foot RJ-12 connecting cable • 24 VAC to 15 VDC power supply for the router • Box mount for FX-ZFR1821 Pro Router • Use the FX-ZFR1821 EMT mount repeater for **above** the ceiling mounting • Use the alternative FX-ZFR1822 Pro Router for flush wall-mount or **below** the ceiling-mount applications. ⓘ **Note:** A field-provided ceiling clip is required to mount the FX-ZFR1822 Pro Router **below** grid ceilings.
FX-ZFR1822-0B	The FX-ZFR1822-0B kit is comprised of the following components: • FX-ZFR1822 Pro Router, wall-mount, with 10-Foot RJ-12 connecting cable • 24 VAC to 15 VDC power supply for the router • Drywall-mounting hardware (ceiling clips not provided due to variety of ceiling types) **Notes:** Use the FX-ZFR1822 Pro Router for flush wall-mount or **below** the ceiling-mount applications. A field-provided ceiling clip is required to mount the FX-ZFR1822 Pro Router **below** grid ceilings. Use the alternative FX-ZFR1821 Pro Router, EMT mount, for **above** the ceiling mounting
FX-ZFR1821-0	The FX-ZFR1821-0 kit is comprised of the following components: • FX-ZFR1821 Pro Router, EMT mount, functions with BACnet WEPCs and FX-WRZ Series Sensors • Box mount for FX-ZFR1821 **Notes:** Use the FX-ZFR1821 EMT mount repeater for above the ceiling mounting.Use the alternative FX-ZFR1822 Pro Router for flush wall-mount or below the ceiling-mount applications. A field-provided ceiling clip is required to mount the FX-ZFR1822 Pro Router below grid ceilings.
FX-ZFR1822-0	The FX-ZFR1822-0 kit is comprised of the following components: • FX-ZFR1822 Pro Router, wall-mount, 10 mW Transmission Power; functions with BACnet FXPCGs, FX-PCXs, FX-PCVs, and FX-WRZ Series Sensors • Drywall-mounting hardware (ceiling clips not provided due to variety of ceiling types) **Notes:** Use the FX-ZFR1822 Pro Router for flush wall-mount or **below** the ceiling-mount applications. A field-provided ceiling clip is required to mount the FX-ZFR1822 Pro Router **below** grid ceilings. Use the alternative FX-ZFR1821 EMT mount repeater for **above** the ceiling mounting.
FX-WNC1820-0B	The FX-WNC1820-OB kit is comprised of the following components: • WNC Gateway and mounting base with 24 VAC Power Supply and WNC power adapter cable. • FX-ZFR1820 Pro Coordinator Radio with 3-Foot RJ-12 connecting cable. • Box mount for FX-ZFR1820 Pro Coordinator Radio

Table 1: WNC1800/FX-ZFR182x Pro Series Wireless Field Bus System components

Code number	Description
FX-WNC1823-0B	The FX-WNC1823-OB kit is comprised of the following components: • WNC Gateway and mounting base with 24 VAC Power Supply and WNC power adapter cable • ZFR1823 Pro Coordinator Radio with 10-Foot RJ-12 connecting cable • Mounting screws for FX-ZFR1823 Pro Coordinator Radio ⓘ **Note:** A field-provided ceiling clip is required to mount the FX-ZFR1823 Pro Coordinator Radio **below** grid ceilings

Table 2: Accessories

Code Number	Description
FX-ZFRCBL-0	Wire Harness with Connectors for use with FX-ZFR182x-x Router for Wireless Field Bus. Allows FXZFR1821 or FX-ZFR1822 Pro Router to function with FX-PCG1620 controller; and with FX-PCG1610, FX-PCV1610, or FX-PCV1620 controllers in conjunction with NS Series Sensors, FX-BTCVT-1 Bluetooth Converter, or FX-DIS1710 Local Controller Display.
FX-ZFRUSBHA-0	Universal Serial Bus (USB) Dongle with FX-ZFR Driver provides a wireless connection through the Controller Configuration Tool (CCT) to allow wireless commissioning of the wirelessly enabled FX-PCG, FX-PCX, and FX-PCV Series Field Controllers. Also used for the ZFR Checkout Tool (ZCT) in CCT.
FX-ZFRWallCover	The FX-ZFRWallCover is an optional accessory of the WNC1800/FX-ZFR1820 Series System and is meant to enable mounting of the FX-ZFR1822 Pro Router or FX-ZFR1823 Pro Coordinator Radio, to be wall-mounted to an existing double-gang electrical box.
FX-WRZSST-120	Optional Wireless Sensing System Tool is used with a FX-WRZ Series Sensor to indicate wireless signal strength between potential locations of FX-ZFR1800 System devices.
1.5 VDC, AA Alkaline Battery	Replacement Battery for FX-WRZ Series Sensors (Purchase Locally)

Technical specifications

Table 3: WNC Gateway

WNC Gateway	
Product Code Number	**FX-WNC1820-0A**: Kit comprised of the following components — FX-WNC1800-0S, FX-ZFR1820 Wireless Router with 3-foot RJ12 connecting cable, 120/240 VAC power supply **FX-WNC1820-0B**: Kit comprised of the following components — FX-WNC1800-0S, FX-ZFR1820 Wireless Router with 3-foot RJ12 connecting cable, 24 VAC power supply **FX-WNC1823-0A**: Kit comprised of the following components — FX-WNC1800-0S, FX-ZFR1823 Wireless Router with 10-foot RJ-12 connecting cable, 120/240 VAC power supply **FX-WNC1823-0B**: Kit comprised of the following components — FX-WNC1800-0S, FX-ZFR1823 Wireless Router with 10-foot RJ-12 connecting cable, 24 VAC power supply
Power Consumption	**From SA/FC bus**: 15 VDC at 2.7 VA maximum
Ambient Temperature Conditions	**Operating**: 0°C to 50°C (32°F to 122°F) **Operating Survival**: -30°C to 60°C (-22°F to 140°F) **Non-Operating**: -40°C to 70°C (-40°F to 158°F)
Ambient Humidity Conditions	**Storage**: -40°C to 70°C (-40°F to 158°F); 5% to 95% Relative Humidity (RH) 30°C (86°F) maximum dew point conditions **Operating**: 0°C to 50°C (32°F to 122°F); 5% to 95% RH, 30°C (86°F) maximum dew point conditions
Wi-Fi Transmission Power (Typical)	Wireless Local Area Network (WLAN) Transmission Power: +14.5 dBm, 54 Mbps +12.5 dBm, 65 Mbps
Wi-Fi WLAN Receiver Sensitivity (Typical)	-76 dBm, 10% packet error rate (PER), 54 Mbps -73 dBm, 10% PER, 65 Mbps
Wi-Fi Transmission Speeds	**Wireless Communication**: 2.4 GHz ISM bands, 802.11 b/g/n, 11/22/54 Mbps **Serial Communication (SA/FC Bus)**: 9600, 19.2k, 38.4k, or 115.2k bps **Ethernet Communication**: 10,100 Mbps
Wi-Fi Transmission Range (Typical)	**Wi-Fi Wireless Communication**: 30 m (100 ft) line-of-sight indoors; however, a typical indoor range in an area with obstacles is 15 m (50 ft). **WLAN Range Performance**: 0–50 ft = Excellent 50–100 ft = Good 100–300 ft = Weakest, approaching out of range
ZFR Pro Transmission Range	ZFR Pro (802.15.4) Communications: 76 m (250 ft) Maximum Indoor Line-of-Sight 15 m (50 ft) Recommended Indoor
Wi-Fi Wireless Security	WPA2-PSK TKIP (Wi-Fi Protected Access Pre-Shared Key Mode Temporal Key Integrity Protocol) WPA2-EAP-PEAP WPA2-EAP-TLS

Table 3: WNC Gateway

WNC Gateway	
Network and Serial Interfaces	One SA/FC port (6-pin port; connects with FX-ZFR1820 or FX-ZFR1823 Pro Coordinator Radio. Can be extended to 30 m (100 ft), if necessary) One USB port (Micro-B port; 2.0; supports Open Host Controller Interface [Open HCI]specification)
Dimensions (H x W x D)	**Unit alone**: 120 mm x 70 mm x 24.5 mm (4-23/32 in. x 2-3/4 in. x 31/32 in. when used vertically) **Unit in shell**: 128 mm x 75 mm x 29.5 mm (5-1/32 in. x 2-61/64 in. x 1-5/32 in. when used vertically)
Housing	White Acrylonitrile butadiene styrene (ABS) bracket, plenum-rated
Weight	**WNC Gateway alone**: 0.10 kg (0.22 lb) ⓘ **Note:** Weights do not include any peripheral components such as cables or an external power supply.
Web Browser Requirements for Computers and Handheld Devices	**Computer**: Windows® Internet Explorer® 10 and Windows Internet Explorer 11, Apple® Safari® 6.1 and later, and Google® Chrome™ **Handheld Device**: 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® versions 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.
Compliance ℂℰ	**United States** UL Listed File E365459, ANSI/UL 60950-1, Information Technology Equipment; UL 2043 (Stationary version only), Suitable for Use in Other Environmental Air Space in Accordance with Section 300.22, (C) of the National Electric Code. Transmission Complies with FCC Part 15.247 Regulations for Low Power Unlicensed Transmitters Transmitter FCC Identification: OEJ-MAPWIFI FCC Compliant to CFR 47, Part 15, Subpart B, Class A FCC Compliant to CFR 47, Part 15, Subpart B, Class A **Canada**: Industry Canada IC: 279A-MAPWIFI IC: RSS-210 ULC Listed File E365459, CAN/CSA-C22.2 No. 60950-1, Safety of Information Technology Equipment **Europe**: CE Mark—Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the RED Directive and the EMC Directive. CE Emission: EN61000-6-3: 2007; Generic standards for residential, commercial, and light-industrial environments. ETSI EN 301 489-1:2001-09, ETSI EN301 489-3:2001-11 (Class 2), IEC 60950-1/ EN 60950-1 **Australia and New Zealand**: RCM Mark, Australia/NZ Emissions Compliant

Table 4: FX-ZFR1820 and FX-ZFR1823 Pro Coordinator Radio

FX-ZFR1820 and FX-ZFR1823 Pro Coordinator Radio	
Product Code Number	**FX-ZFR1820-x**: FX-ZFR1820 Pro Conduit-Mount Coordinator Radio **FX-ZFR1823-x**: FX-ZFR1823 Pro Wall-Mount Coordinator Radio
Power Supply Input	15 VDC Nominal. Provided through the RJ-12 cable connected to the WNC Gateway.
Addressing	DIP Switches, Field Adjustable
Wireless Band	Direct-Sequence Spread-Spectrum, 2.4 GHz ISM Bands
Transmission Power	10 mW Maximum
Transmission Range	76.2 m (250 ft) Maximum Line-of-Sight , 15 m (50 ft) Recommended
Ambient Conditions	**Operating:** 0°C to 50°C (32°F to 122°F), 5% to 95% RH, Noncondensing **Storage:** -20°C to 70°C (-4°F to 158°F), 5% to 90% RH, Noncondensing **Maximum Dew Point Temperature**: 30°C (86°F) **Condensation**: Recovers after 30 minute dry time
Materials	**FX-ZFR1820**: White Plastic Housing with Plenum rating per UL1995 UL94-5VB Flammability Rating **FX-ZFR1823**: White PC/ABS Cycoloy™
Terminations	RJ-12 plug for connection to WNC1800 Gateway
Dimensions	**FX-ZFR1820**: 136 mm x 100 mm x 18 mm (5-3/8 in. x 3-15/16 in. x 3/4 in.) **FX-ZFR1823**: 63.5 mm x 100 mm x 20.3 mm (2-1/2 in. x 3-15/16 in. x 4/5 in.)
Mounting Hardware	**FX-ZFR1820**: 1/2 in. trade size Electrical Mechanical Tubing (EMT) connector **FX-ZFR1823**: Screw mounted
Shipping Weights	**FX-ZFR1820**: 0.095 kg (0.21 lb) **FX-ZFR1823**: 0.113 kg (.25 lb)
Compliance C€	**United States**: UL 916 Energy Management. Plenum rated per UL1995 UL94-5VB Flammability Rating. FCC Compliant to CFR47, Part 15, Subpart B, Class A. Transmission Complies with FCC Part 15.247 Regulations for Low Power Unlicensed Transmitters. Transmitter Identification FX-ZFR1820/FX-ZFR1823: FCC: OEJ-WRZRADIO **Canada**: CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada (IC) Compliant to Canadian ICES-003, Class B Limits Industry Canada (IC) RSS-210 Transmitter Identification FX-ZFR1820/FX-ZFR1823: 279A-WRZRADIO **Australia and New Zealand:** RCM Mark, Australia/NZ Emissions Compliant **Europe**: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.

Table 5: FX-ZFR1821 and FX-ZFR1822 Pro Routers

FX-ZFR1821 and FX-ZFR1822 Pro Routers	
Product Code Number	**FX-ZFR1821-0**: Wireless Field Bus Router, Conduit-Mount, for Field Controller Router Applications **FX-ZFR1822-0**: Wireless Field Bus Router, Wall-Mount, for Field Controller Router Applications **FX-ZFR1821-0B**: Wireless Field Bus Router, Conduit-Mount, with 24 VAC Power Supply for Field Controller Router Applications **FX-ZFR1822-0B**: Wireless Field Bus Router, Wall-Mount, with 24 VAC Power Supplyfor Field Controller Router Applications
Power Supply Input	15 VDC Nominal. Provided through the RJ-12 cable connected from a field controller or repeater power supply.
Addressing	DIP Switches, Field Adjustable
Wireless Band	Direct-Sequence Spread-Spectrum, 2.4 GHz ISM Bands
Transmission Power	10 mW Maximum
Transmission Range	76.2 m (250 ft) Maximum Line-of-Sight 15 m (50 ft) Recommended
Ambient Conditions	**Operating:** 0°C to 50°C (32°F to 122°F), 5% to 95% RH, Noncondensing **Storage:** -20°C to 70°C (-4°F to 158°F), 5% to 90% RH, Noncondensing
Materials	**FX-ZFR1821**: White Plastic Housing with Plenum rating per UL1995 UL94-5VB Flammability Rating **FX-ZFR1822**: White PC/ABS Cycoloy™
Terminations	RJ-12 plug for connection to field controllers or Repeater Kit power supply
Dimensions	**FX-ZFR1821**: 136 mm x 100 mm x 18 mm (5-3/8 in. x 3-15/16 in. x 3/4 in.) **FX-ZFR1822**: 61 mm x 100 mm x 20.5 mm (5-3/8 in. x 3-15/16 in. x 3/4 in.)
Mounting Hardware	**FX-ZFR1821**: 1/2 in. trade size Electrical Mechanical Tubing (EMT) connector **FX-ZFR1822**: Screw mounted
Shipping Weights	**FX-ZFR1821**: 0.095 kg (0.21 lb) **FX-ZFR1822**: 0.113 kg (.25 lb) **Repeater Power Supply**: 227 kg (.50 lb)
Compliance CE	**United States**: UL 916 Energy Management Plenum-rated per UL1995 UL94-5VB Flammability Rating FCC Compliant to CFR47, Part 15, Subpart B, Class A Transmission Complies with FCC Part 15.247 Regulations for Low Power Unlicensed Transmitters Transmitter Identification FX-ZFR1821/FX-ZFR1822: FCC: OEJ-WRZRADIO **Canada**: CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada (IC) Compliant to Canadian ICES-003, Class B Limits Industry Canada (IC) RSS-210 Transmitter Identification FX-ZFR1821/FX-ZFR1822: 279A-WRZRADIO **Australia and New Zealand:** RCM Mark, Australia/NZ Emissions Compliant **Europe**: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.