F4-CG General Purpose Application Controller Catalog Page

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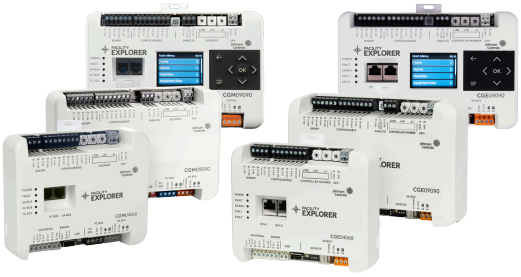
General Purpose Application Controllers (CG Series)

Figure 1: F4-CG General Purpose Application Controllers



The CG series general purpose application controllers are well-suited for controlling a wide variety of facility and HVAC equipment, including fan coils, air handling units, packaged HVAC equipment, and central plant equipment. CG series controllers run pre-engineered and user-programmed applications.

CG series controllers include an integral real-time clock, which enables the controllers to monitor and control schedules, calendars, and trends, and operate for extended periods of time as standalone controllers when offline from the Facility Explorer system network. Some models feature an integral color display with a navigation keypad that enables enhanced local monitoring of controlled field equipment.

CGE controllers communicate using the BACnet® Secure Connect (BACnet/SC) or BACnet/IP communication protocols. CGM controllers are switchable to use either the BACnet MS/TP or N2 communications protocol. Equipment controllers in BACnet/SC, BACnet/IP, or BACnet MS/TP communication mode are BACnet network-compliant devices. You can use controllers running in N2 mode to maintain or modernize sites with installed legacy Johnson Controls® controllers.

For product application details, refer to the *Facility Explorer CG, CV Equipment Controllers Product Bulletin (LIT-12013225)*.

Features and benefits

Sleek and modern packaging and styling

Provides a modern, aesthetically pleasing industrial design.

Standard hardware and software platform

Uses a common hardware design throughout the family line to support standardized wiring practices and installation workflows. Also uses a common software design to support use of a single tool for control applications, commissioning, and troubleshooting to minimize technical training.

High memory capacity and fast processing power

Provides application engineers with the horsepower to meet sophisticated control requirements.

Auto-Tuned Control Loops

Proportional Adaptive Control (P-Adaptive) and Pattern Recognition Adaptive Control (PRAC) delivers continuous control loop tuning, which reduces commissioning time, eliminates change-of-season re-commissioning, and reduces wear and tear on actuators.

Standard BACnet protocol

Provides interoperability with other Building Automation System (BAS) products that use the widely accepted BACnet standard.

Models to support BACnet/IP and BACnet/SC communications

Provides higher speed communication with the Controller Configuration Tool (CCT) and improved bandwidth. BACnet/SC is a new protocol that provides a secure method of communication on IP networks. It uses standards widely accepted by the IT community thus eliminating many of the IT concerns.

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Models to support wired BACnet MS/TP, ZFR wireless, and N2 with streamlined workflow

CGM controllers can support multiple communication protocols without the need to purchase a special model per protocol and without extra manual setup. If an application configured for N2 communication is loaded on the controller, it automatically communicates through N2. Controllers will otherwise default to MS/TP communication. If a ZFR Pro Wireless Field Bus Router is connected to the controller when the controller is initially powered on, it automatically enters wireless mode.

BACnet Testing Laboratories (BTL) listed and certified as BACnet Advanced Application Controllers (B-AAC)

Ensures openness and interoperability with other BTL-listed devices. BTL is a third-party agency, which validates that BAS vendor products meet the BACnet industry-standard protocol.

BACnet automatic discovery

Supports easy controller integration into a Facility Explorer (FX) BAS.

Device Security

Ensures device integrity while the system is rebooting and during normal operation. Embedded software in the CGE controller provides secure boot operation, firmware protection, secure communications, and secure firmware updates to comply with cyber security best practices.

FIPS 140-2 Level 1 compliance using FIPS validated components

CGE controllers are FIPS 140-2 Level 1 compliant using FIPS validated components. FIPS 140-2 is a U.S. government cyber security standard used to approve cryptographic modules and algorithms used for encryption. Assures operators that Facility Explorer uses leading cyber security techniques to help prevent unauthorized access to systems and data.

Wireless ZFR Pro support

Wireless ZFR Pro support provides a wireless alternative to hard-wired MS/TP networking, offering application flexibility and mobility with minimal disruption to building occupants, and also simplifies and speeds up replacements.

Integral real-time clock

An integral real-time clock, which enables the controllers to monitor and control schedules, calendars, and trends, and operate for extended periods of time as stand-alone controllers when offline from the FX system network.

Pluggable screw terminal blocks

Pluggable input/output wiring terminal blocks that can be removed from the controller provide electrical installers and field technicians the ability to quickly and easily install and service a controller without the need to disconnect and reconnect the input/output wiring.

Rotary switches for controller address/controller number

Easy-to-use rotary switches set the MS/TP address or controller number in for Ethernet controllers decimal format.

Universal Inputs and Configurable Outputs

Allows multiple signal options to provide input/output flexibility.

End-of-Line (EOL) switch in MS/TP equipment controllers

Enables equipment controllers to be terminating devices on the communications bus.

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Default State for Input/Output wiring validation

Enables validation of the input and output terminals' wiring without having to download an application file.

Background transfer coupled with enable/ disable logic options in Controller Configuration Tool (CCT)

Saves field technicians' time, enables productivity and minimizes equipment disruption, since the controllers are operating while file updates take place in the background and the application can be left disabled until the system is ready to run.

SA Bus device provisioning improvements

Saves field technicians time when commissioning SA Bus devices by enabling an equipment controller to transfer and apply firmware files to all the SA Bus devices (XPM, PCX, NS8000) connected to it.

Models with onboard display and navigation keypad

Provides an intuitive local interface for users to monitor point values and status, view alarms, view trends, override outputs, and adjust setpoints and parameters. The easy-to-use display provides the ability to quickly troubleshoot issues and restore control while being near the associated mechanical equipment.

Local Controller Display and the Mobile Access Portal (MAP) Support

Enable monitoring and commanding of I/O and configuration parameters.

CG series model information

Table 1: CG series information including point type counts

CG series information	Description		
Communication protocol	**CGM09090-0/0H and CGM04060-0:** BACnet MS/TP, N2, or Zigbee Wireless (using add-on modules) **CGE09090-0/0H and CGE04060-0:** BACnet/SC or BACnet/IP		
Modular jacks	**CGM09090-0/0H and CGM04060-0:** FC and SA Bus Modular Ports: RJ-12 6-Pin Modular Jacks **CGE09090-0/0H and CGE04060-0:** RJ-12 6-Pin Sensor Port		
Point types	**Signals accepted**	**CGM09090-0/0H CGE09090-0/0H**	**CGM04060-0 CGE04060-0**
Universal Input (UI)	15 VDC Power Source (Provide 100mA total current) Analog Input - Voltage Mode (0–10 VDC) Analog Input - Current Mode (4–20 mA) Analog Input - Resistive Mode (0–600k ohm), RTD (1k Nickel [Johnson Controls sensor], 1k PT, A998 SI), NTC (10k Type L, 2.252k Type 2) Binary Input - Dry Contact Maintained Mode Universal Input Common	7	3
Binary Input (BI)	Binary Input - Dry Contact Maintained Mode Binary Input - Pulse Counter/Accumulator Mode Binary Input Common	2	1
Binary Output (BO)	Binary Output - 24 VAC Triac (External Power Source) Binary Output Common	3	2

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Table 1: CG series information including point type counts

CG series information	Description		
Configurable Output (CO)	Analog Output - Voltage Mode (0–10 VDC) Binary Output - 24 VAC Triac Analog Output Signal Common Binary Output Signal Common	4	4
Analog Output (AO)	Analog Output - Voltage Mode (0–10 VDC) Analog Output - Current Mode (4–20 mA) Analog Output Signal Common	2	0
SA Bus	Supports up to 10 total wired SA Bus devices, including the XPM and PCX series expansion I/O modules.		
	Supports up to four NS Series Network Sensors.		
WRZ sensors	Supports up to nine WRZ sensors when using the ZFR or ZFR Pro Series wireless router configuration.		
	Supports up to five WRZ sensors when using the one-to-one WRZ-78xx wireless configuration.		

ⓘ **Note:** The models that end in **H** feature a built-in display.

CG series ordering information and accessories

Table 2: CG series ordering information

Product code number	Description
F4-CGM09090-0	18-point General Purpose Application MS/TP Controller Includes: MS/TP and N2 communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input
F4-CGM09090-0H	18-point General Purpose Application MS/TP Controller with integral display Includes: MS/TP and N2 communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input; Integral 2.4 inch color display and navigation keypad
F4-CGM04060-0	10-point General Purpose Application MS/TP Controller Includes: MS/TP and N2 communication; 10 points (3 UI, 1 BI, 4 CO, 2 BO); real-time clock; 24 VAC input
F4-CGE09090-0	18-point General Purpose Application Ethernet Controller Includes: BACnet/SC and BACnet/IP communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input
F4-CGE09090-0H	18-point General Purpose Application Ethernet Controller with integral display Includes: BACnet/SC and BACnet/IP communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input; Integral 2.4 inch color display and navigation keypad
F4-CGE04060-0	10-point General Purpose Application Ethernet Controller Includes: BACnet/SC and BACnet/IP communication; 10 points (3 UI, 1 BI, 4 CO, 2 BO); real-time clock; 24 VAC input

ⓘ **Note:** CGM and CGE models that comply with Buy American Act requirements are available. To order a model that complies with the Buy American Act requirements, add a G to the end of the product code. For example, F4-CGM09090-0G.

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Table 3: CG series accessories (order separately)

Product code number	Description
XPM Series Expansion Modules	Refer to the *F4-XPM Expansion Modules Catalog Page (LIT-1901150)* for a complete list of available Expansion Modules.
PCX Series Expansion Modules	Refer to the *FX-PC Series Programmable Controllers and Related Products Product Bulletin (LIT-12011657)* for a complete list of available Expansion Modules.
TL-CCT-0	License enabling Controller Configuration Tool (CCT) software for one user
FX-FCP-0	License enabling Facility Explorer Equipment Controller Firmware Package Files required for CCT
TL-CWCVT-0	Communications converter that provides a temporary wireless connection between a host device and equipment controllers that support the BACnet MS/TP protocol.
F4-DLK0350-0	Local Controller Display, 3.5 in. (89 mm) color display with navigation keypad
NS-ATV7003-0	Handheld VAV Balancing Tool
NS Series Network Sensors	Refer to the *NS Series Network Sensors Product Bulletin (LIT-12011574)* for specific sensor model descriptions.
AS-CBLTSTAT-0	Cable adapter for connection to 8-pin TE-6700 Series sensors
NS-WALLPLATE-0	Network Sensor Wall Plate
WRZ Series Wireless Room Sensors	Refer to the *WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653)* for specific sensor model descriptions.
WRZ-7860-0	Refer to the *WRZ-7860 Receiver for One-to-One Wireless Room Sensing Product Bulletin (LIT-12011640)* for a list of available products.
ZFR-HPSST-0	Wireless System Survey Tool. For use with the higher power WRG1830/ZFR183x System and lower power WRZ Sensors (10mW). Refer to the *Hi Power Survey Tool Installation Document (Part No.24-11461-00012)* for usage instructions.
WRG1830/ZFR183x Pro Series Wireless Field Bus System	For more information on products needed for wireless field bus installations and for a list of available products, refer to the *WRG1830/FX-ZFR183x Pro Series Wireless Field Bus System Catalog Page (LIT-1901153)*.
Y65A13-0	Transformer, 120 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount (Y65AS), 20.32 cm (8 in.), Primary Leads and 76.2 cm (30 in.) Secondary Leads, Class 2
Y65T31-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount (Y65AR+), 20.32 cm (8 in.), Primary Leads and Secondary Screw Terminals, Class 2
Y65T42-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Hub Mount (Y65SP+), 20.32 cm (8 in.), Primary Leads and Secondary Screw Terminals, Class 2
MS-FIT100-0	The Field Inspection Tool or (FIT) is a portable handheld device with a user interface that is used to test and troubleshoot the BACnet protocol MS/TP RS-485 communications bus that connects supervisory controllers and equipment controllers to field point interfaces. The FIT can be used to check out the wiring of the MS/TP RS-485 bus as well as verify proper communications of supervisory controllers and equipment controllers connected to the bus. The FIT can be used on both the FC Bus and SA Bus.
TL-BRTRP-0	Portable BACnet/IP to MS/TP Router
ACC-TBKPWFCSA-0	Power, FC Bus, and SA Bus terminal block replacement kit for SNC, CG series, CV series, CCM, and XPM products. Kit includes 5 of each terminal block type. 15 terminal blocks in total.
ACC-TBKINOUT-0	Input and Output terminal block replacement kit for SNC, CG series, CV series, CCM, and XPM products. Kit includes 5 of each 2, 3, and 4 position Input and Output terminal blocks. 30 terminal blocks in total.

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CG series technical specifications

Table 4: Technical specifications for CG series controllers

Specification	Description
Power requirement	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, power supply Class 2 (North America), Safety Extra-Low Voltage (SELV) (Europe)
Power consumption	**F4-CGM models:** 14 VA maximum **F4-CGE models:** 15 VA maximum
Power source	+15 VDC power source terminals provide 100 mA total current. **F4-CGM09090, F4-CGE09090:** Two +15VDC terminals located in Universal IN terminals for active (3-wire) input devices ⓘ **Note:** The controllers listed contain only one +15VDC Power Supply for each controller. **F4-CGM04060, F4-CGE04060:** One +15VDC power source terminal located in Universal IN terminals for active (3-wire) input devices
Ambient conditions	**Operating:** 0°C to 50°C (32°F to 122°F); 10 to 90% RH noncondensing ⓘ **Note:** For UL 864 10th Edition/cUL applications, operating: 0°C to 49°C (32°F to 120°F) **Storage:** -40°C to 80°C (-40°F to 176°F); 5 to 95% RH noncondensing
Communications protocol	**F4-CGM models:** BACnet MS/TP, N2, ZFR Wireless also supported (at FC Bus and for Sensors) with additional hardware. **F4-CGE models:** BACnet/IP or BACnet/SC
Device addressing for BACnet MS/TP	Decimal address set using three rotary switches: valid controller device addresses 4-127
Device addressing for N2	Decimal address set using three rotary switches: valid controller device addresses 1-253
Controller number for Ethernet controllers	Three rotary switches to assign a unique number for each controller to physically identify the controller and relate it to the building drawings; valid controller numbers 0-999
Communications bus	**F4-CGM models** BACnet MS/TP (default); N2 3-wire FC Bus between the supervisory controller and equipment controllers **F4-CGE models** BACnet/IP (default); BACnet/SC Two Ethernet ports; 10/100 Mbps; 8-pin RJ-45 connector **All F4-CG models** 4-wire SA Bus between equipment controller, network sensors and other sensor/actuator devices, includes a lead to source 15 VDC supply power, from equipment controller, to bus devices.
Processor	RX64M Renesas® 32-Bit microcontroller
Memory	16 MB flash memory and 8 MB SDRAM
Real-time clock backup power supply	Super capacitor maintains power to the onboard real-time clock for a minimum of 72 hours when supply power to the controller is disconnected.

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Table 4: Technical specifications for CG series controllers

Specification	Description
Input and Output capabilities	**F4-CGM09090, F4-CGE09090** 7 - Universal Inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohms, or Binary Dry Contact 2 - Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator Mode 4 - Configurable Outputs: Defined as 0-10 VDC or 24 VAC Triac BO 2 - Analog Outputs: Defined as 0–10 VDC or 4–20 mA 3 - Binary Outputs: Defined as 24 VAC Triac (external power source only) **F4-CGM04060, F4-CGE04060** 3 - Universal Inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohms, or Binary Dry Contact 1 - Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator Mode 4 - Configurable Outputs: Defined as 0-10 VDC or 24 VAC Triac BO 2 - Binary Outputs: Defined as 24 VAC Triac (external power source only)
Universal Input (UI) resolution/ Analog Output (AO) accuracy	**Input:** 24-bit Analog to Digital converter **Output:** +/- 200 mV accuracy in 0–10 VDC applications
Terminations	**Input/Output:** Pluggable Screw Terminal Blocks **FC Bus, SA Bus, and Supply Power:** 4-Wire and 2-Wire Pluggable Screw Terminal Blocks **FC and SA Bus Modular Ports:** RJ-12 6-Pin Modular Jacks ⓘ **Note:** The FC Bus Terminal and FC Bus Port are only available on the CGM models
Mounting	Horizontal on single 35 mm DIN rail mount (recommended), or screw mount on flat surface with three integral mounting clips on controller
Housing	**Enclosure material:** ABS and polycarbonate UL94 5VB; Self-extinguishing Protection Class: IP20 (IEC529)
Dimensions (Height x Width x Depth)	**F4-CGM09090, F4-CGE09090:** 150 mm x 190 mm x 44.5 mm (5-7/8 in. x 7-1/2 in. x 1-3/4 in.) including terminals and mounting clips. **F4-CGM04060, F4-CGE04060:** 150 mm x 152 mm x 44.5 mm (5-7/8 in. x 6 in. x 1-3/4 in.) including terminals and mounting clips ⓘ **Note:** Mounting space requires an additional 50 mm (2 in.) space on top, bottom, and front face of controller for easy cover removal, ventilation, and wire terminations.
Weight	**F4-CGM04060,F4-CGE04060:** 0.29 kg (0.64 lb) **F4-CGM09090,F4-CGE09090:** 0.4 kg (0.89 lb) **F4-CGM09090-0H,F4-CGE09090-0H:** 0.47 kg (1.04 lb)
Compliance	**United States:** UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment FCC Compliant to CFR47, Part 15, Subpart B, Class A
	Canada: UL Listed, File E107041, CCN PAZX7 CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada Compliant, ICES-003
CE	**Europe:** Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and RoHS Directive.
	**Australia and New Zealand:** RCM Mark, Australia/NZ Emissions Compliant

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Table 4: Technical specifications for CG series controllers

Specification	Description
	BACnet International: Certification pending to BACnet Testing Laboratories™ (BTL) Protocol Revision 19 BACnet Advanced Application Controller (B-AAC), based on ANSI/ASHRAE 135-2020
UK CA	**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.

1 The VA rating does **not** include any power supplied to the peripheral devices connected to Configurable Outputs (COs) or Binary Outputs (BOs), which can consume up to 12 VA for each CO or BO; for a possible total consumption of an additional 84 VA (maximum).

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.

Repair information

If a controller, network sensor, or any related product fails to operate within its specifications, replace the product. For replacement products, contact the nearest Johnson Controls representative.

Product warranty

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

Patents

Patents: https://jcipat.com

Single point of contact

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