CG General Purpose Application Controller Catalog Page

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General Purpose Application Controllers (CG Series)

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 Metasys system network.

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

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

Patented Proportional Adaptive Control (PAdaptive) 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 communications

CGE controllers provide higher speed communication with the Controller Configuration Tool (CCT) and improved bandwidth.

Models to support both BACnet MS/TP and N2, with auto-detection of the communications protocols

CGM controllers auto-detect the BACnet MS/TP or N2 protocol that is connected to it, which enables the same controller to support multiple communication protocols without the need to purchase a special model per protocol, and without extra manual setup.

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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 Metasys BAS.

Wireless ZFR and ZFR Pro support

Wireless ZFR and 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 Metasys 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 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.

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) and System Configuration Tool (SCT)

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 connected SA Bus (IOM, XPM, NS8000) devices at the same time.

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CG model information

Table 1: CG series information including point type counts

Communication protocol	**CGM09090-0 and CGM04060-0:** BACnet MS/TP, N2, or Zigbee Wireless (using add-on modules) **CGE09090-0 and CGE04060-0:** BACnet/IP		
Supported Network Engines	**CGM09090-0 and CGM04060-0:** All network engine model types **CGE09090-0 and CGE04060-0:** All network engine model types at R9.0 or later. Refer to the *Network Engines Product Bulletin (LIT-12012138)* for details.		
Modular Jacks	**CGM09090-0 and CGM04060-0:** FC and SA Bus Modular Ports: RJ-12 6-Pin Modular Jacks **CGE09090-0 and CGE04060-0:** RJ-12 6-Pin Sensor Port		
Point Types	**Signals Accepted**	**CGM09090-0 CGE09090-0**	**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
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 IOM series expansion I/O modules and up to 4 NS series network sensors		
WRZ Sensors	Supports up to 9 WRZ sensors when using the ZFR or ZFR Pro Series wireless router configuration		
	Supports up to 5 WRZ sensors when using the one-to-one WRZ-78xx wireless configuration		

Ordering information and accessories

Table 2: Ordering information

Product code number	Description
M4-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
M4-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
M4-CGE09090-0	18-point General Purpose Application Ethernet Controller Includes: BACnet/IP communication; 18 points (7 UI, 2 BI, 4 CO, 2 AO, 3 BO); real-time clock; 24 VAC input
M4-CGE04060-0	10-point General Purpose Application Ethernet Controller Includes: and BACnet/IP communication; 10 points (3 UI, 1 BI, 4 CO, 2 BO); real-time clock; 24 VAC input

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Table 3: Accessories (order separately)

Product code number	Description
XPM Series Expansion Modules	Refer to the *M4-XPM Expansion Modules Catalog Page (LIT-1901145)* for a complete list of available Expansion Modules.
IOM Series Expansion Modules	Refer to the *Metasys® System Field Equipment Controllers and Related Products Product Bulletin (LIT-12011042)* for a complete list of available Expansion Modules.
TL-CCT-0	License enabling Controller Configuration Tool (CCT) software for one user
MS-FCP-0	License enabling Metasys Equipment Controller Firmware Package Files required for CCT
TL-MAP1810-0Px	Refer to the *Mobile Access Portal Gateway Catalog Page (LIT-1900869)*to identify the appropriate product for your region.
MS-DIS1710-0	Local Controller Display
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/ZFR183x Pro Series Wireless Field Bus System Catalog Page (LIT-1901153).*
ZFR-USBHA-0	ZFR USB Dongle provides a wireless connection through CCT to allow wireless commissioning of the wirelessly enabled CGM and CVM controllers. It also allows use of the ZFR Checkout Tool (ZCT) in CCT. ⓘ **Note:** The ZFR-USBHA-0 is not compatible with the WRG1830/ZFR183x Pro Series. ⓘ **Note:** The ZFR-USBHA-0 replaces the IA OEM DAUBI_2400 ZFR USB dongle. For additional information about the ZFR-USBHA-0 ZFR dongle, refer to the *ZCT Checkout Tool Help LIT-12012292* or the *WNC1800_ZFR182x Pro Series Wireless Field Bus System Technical Bulletin (LIT-12012356)*.
Y64T15-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 92 VA, Foot Mount, 72.2 cm (30 in.), Primary Leads and 76.2 cm (30 in.) Secondary Leads, Class 2
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, 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 and XPM products. Kit includes 5 of each 2, 3, and 4 position Input and Output terminal blocks. 30 terminal blocks in total.

CG Series technical specifications

Table 4: Technical Specifications for CG Series Controllers

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	14 VA maximum[1] ⓘ **Note:** The USB feature is not currently supported.
Power Source	+15 VDC power source terminals provide 100 mA total current. **M4-CGM09090, M4-CGE09090:** Quantity 2 located in Universal IN terminals for active (3-wire) input devices **M4-CGM04060, M4-CGE04060:** Quantity 1 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 **Storage:** -40°C to 80°C (-40°F to 176°F); 5 to 95% RH noncondensing
Supported Network Engines	**M4-CGM models:** All network engine model types **M4-CGE models:** All network engine model types at R9.0 or later.
Communications Protocol	**M4-CGM models:** BACnet MS/TP; N2. Zigbee wireless also supported (at FC Bus and for Sensors) with additional hardware. **M4-CGE models:** BACnet/IP
Device Addressing for BACnet MS/TP	Decimal address set via three rotary switches: valid controller device addresses 4-127
Device Addressing for N2	Decimal address set via three rotary switches: valid controller device addresses 1-254
Controller Number for Ethernet controllers	3 rotary switches to assign a unique number for each controller on the subnet to identify it in the CCT controller configuration tool for uploading and downloading
Communications Bus	**M4-CGM models** BACnet MS/TP (default); N2 3-wire FC Bus between the supervisory controller and equipment controllers **M4-CGE models** BACnet/IP Two Ethernet ports; 10/100 Mbps; 8-pin RJ-45 connector **All M4-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.
Input and Output Capabilities	**M4-CGM09090, M4-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) **M4-CGM04060, M4-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

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Table 4: Technical Specifications for CG Series Controllers

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 CVM 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)	**M4-CGM09090, M4-CGE09090:** 150 mm x 190 mm x 44.5 mm (5-7/8 in. x 7-1/2 in. x 2-1/8 in.) including terminals and mounting clips. **M4-CGM04060, M4-CGE04060:** 150 mm x 152 mm x 44.5 mm (5-7/8 in. x 6 in. x 2-1/8 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	**M4-CGM09090, M4-CGE09090:** 0.5 kg (1.1 lb) **M4-CGM04060, M4-CGE04060:** 0.29 kg (0.64 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 nd RoHS Directive.
	Australia and New Zealand: RCM Mark, Australia/NZ Emissions Compliant
	BACnet International: BACnet Testing Laboratories™ (BTL) Protocol Revision 18 Listed and Certified BACnet Advanced Application Controller (B-AAC), based on ANSI/ASHRAE 135-2016

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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