IOM2723 Input/Output Module Installation Guide

Part No. 24-10143-1108 Rev. E

2019-10-18

Application

The MS-IOM2723 input/output expansion module is part of the *Metasys*® system Field Equipment Controller family. Input/Output expansion modules (IOMs) expand the number of Input/Output points connected to either a Network Automation Engine (NAE), Network Control Engine (NCE), Advanced Application Field Equipment Controller (FAC), Field Equipment Controller (FEC), or Variable Air Volume Modular Assembly (VMA) to monitor and control a wide variety of HVAC equipment.

Note: The IOM2723 model is only available in certain regions. Contact your local Johnson Controls representative for more information.

IOMs operate on an RS-485 BACnet® MS/TP Bus and integrate into Johnson Controls® and third-party BACnet systems. IOMs communicate using the BACnet MS/TP protocol when directly connected to the FC Bus.

Note: With Release 10.1 or later of the Controller Configuration Tool (CCT), VMAs, FECs, and FACs can be configured to communicate using either the BACnet MS/TP or the N2 field bus networking protocol. The operation of the IOM is not affected by the selection of the BACnet MS/TP or the N2 protocol in the host controller, when the IOM is connected to the host controller using the SA bus.

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.

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.

Installation

Observe these guidelines when installing an expansion module:

- To minimize vibration and shock damage, transport the expansion module in the original container.
- Verify that all parts shipped with the expansion module.
- Do not drop the expansion module or subject it to physical shock.

Parts included

- One MS-IOM expansion module with removable terminal blocks (Power and SA/FC bus are removable)
- One installation instructions sheet

Materials and special tools needed

- Three fasteners appropriate for the mounting surface (M4 screws or #8 screws)
- One 20 cm (8 in.) or longer piece of 35 mm DIN rail and appropriate hardware for DIN rail mount
- Small straight-blade screwdriver for securing wires in the terminal blocks

Physical features

The following figure displays the physical features of the IOM, and the accompanying table provides a description of the physical features and a reference to further information where required.

(barcode for factory use only)

Figure 1: IOM2723 Physical Features

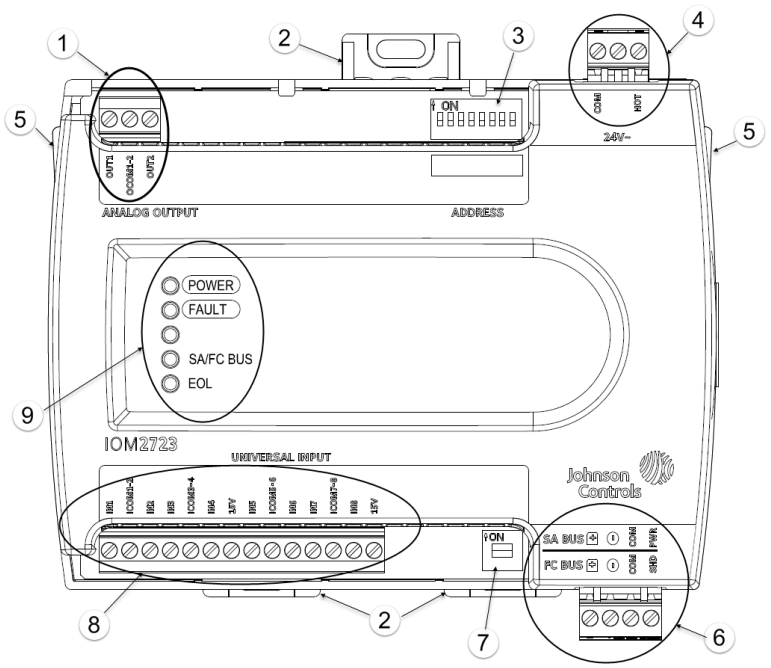


Table 1: IOM2723 physical features callouts and descriptions

	Physical feature: description and references
1	Analog Outputs (AOs) Terminal Block (see Table 2)
2	Mounting Clip
3	Device Address DIP Switch Block (see Setting the device address)
4	24 VAC, Class 2 Supply Power Terminal Block (see Supply power terminal block)
5	Cover Lift Tab (see Removing the expansion module cover)
6	Sensor Actuator (SA) Bus/Field Controller (FC) Bus Terminal Block (see SA/FC bus terminal block)
7	End-of-Line (EOL) Termination Switch (see Setting the End-of-Line (EOL) Switch)
8	Universal Inputs (UIs) Terminal Block (see Table 2)
9	LED Status Indicators (see Table 8)

Mounting

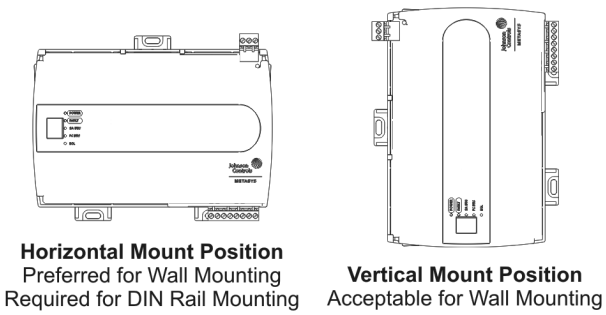
Observe the following guidelines when mounting an expansion module:

- Ensure the mounting surface can support the expansion module, DIN rail, and any user-supplied enclosure.
- Mount the expansion module horizontally on 35 mm DIN rail whenever possible.
- Mount the expansion module in the proper mounting position (Figure 2).
- Mount the expansion module on a hard, even surface whenever possible in wall-mount applications.
- Use shims or washers to mount the expansion module securely and evenly on the mounting surface.
- Mount the expansion module in an area free of corrosive vapors and observe the Ambient Conditions requirements in Table 10.
- Provide for sufficient space around the expansion module for cable and wire connections for easy cover removal and good ventilation through the expansion module (50 mm [2 in.] minimum on the top, bottom, and front of the expansion module).
- Do not mount the expansion module on surfaces prone to vibration, such as duct work.
- Do not mount the expansion module in areas where electromagnetic emissions from other devices or wiring can interfere with expansion module communication.

Observe these additional guidelines when mounting an expansion module in a panel or enclosure:

- Mount the expansion module so that the enclosure walls do not obstruct cover removal or ventilation through the expansion module.
- Mount the expansion module so that the power transformer and other devices do not radiate excessive heat to the expansion module.
- Do not install the expansion module in an airtight enclosure.

Figure 2: Mounting positions



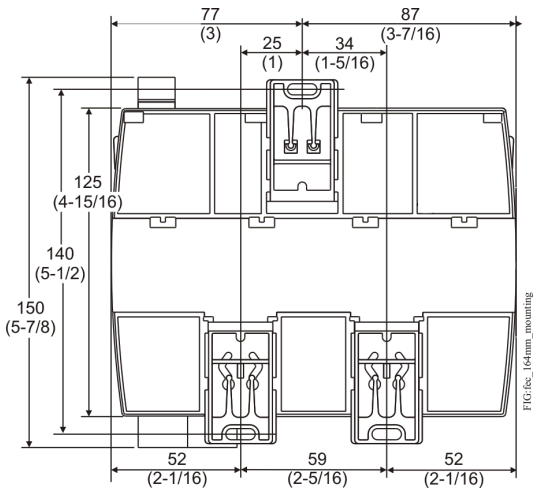
Horizontal Mount Position
Preferred for Wall Mounting
Required for DIN Rail Mounting

Vertical Mount Position
Acceptable for Wall Mounting

Mounting features and dimensions

See the following figure for mounting dimensions listed in millimeters and inches. Inches are listed in parenthesis. The following figure also illustrates the DIN rail channel and the mounting clips in an extended position.

Figure 3: Back of expansion module



DIN rail mount applications

Mounting the expansion module horizontally on 35 mm DIN rail is the preferred method.
To mount an expansion module on a 35 mm DIN rail, complete the following steps:

1. Securely mount a 20 cm (8 in.) or longer section of 35 mm DIN rail, horizontally and centered in the desired space, so that the expansion module mounts in the position shown in Figure 2.
2. Pull the two bottom mounting clips outward from the expansion module to the extended position (Figure 3).
3. Hang the expansion module on the DIN rail by the hooks at the top of the DIN rail channel on the back of the expansion module (Figure 3), and position the expansion module snugly against the DIN rail.
4. Push the bottom mounting clips inward (up) to secure the expansion module on the DIN rail.

To remove the expansion module from the DIN rail, pull the bottom mounting clips out to the extended position and carefully lift the expansion module off the DIN rail.

Wall mount applications

To mount an expansion module directly on a wall or other flat vertical surface, complete the following steps:

1. Pull the two bottom mounting clips outward and ensure they are locked in the extended position, as shown in Figure 3.
2. Mark the mounting hole locations on the wall using the dimensions in Figure 3 and one of the mount positions shown in Figure 2. You can also hold the expansion module up to the wall or surface in a proper mount position and mark the hole locations through the mounting clips.
3. Drill holes in the wall or surface at the marked locations, and insert appropriate wall anchors in the holes (if necessary).
4. Hold the expansion module in place, and insert the screws through the mounting clips and into the holes (or anchors). Carefully tighten all of the screws.

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

Wiring

⚠ Warning

Risk of Electric Shock:

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

⚠ Avertissement

Risque de décharge électrique:

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

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

Mise En Garde: Risque de dégâts matériels:

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

- **Important:** Do not exceed the expansion module electrical ratings. Exceeding expansion module electrical ratings can result in permanent damage to the expansion modules and void any warranty.
- **Important:** Use copper conductors only. Make all wiring in accordance with local, national, and regional regulations.
- **Important:** Electrostatic discharge can damage expansion module components. Use proper electrostatic discharge precautions during installation, setup, and servicing to avoid damaging the expansion module.

For detailed information on configuring and wiring an MS/TP bus, FC bus, and SA bus, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

Terminal blocks and bus ports

See Figure 1 for terminal block and bus port locations on the expansion module. Observe the following guidelines when wiring an expansion module.

Input and output terminal blocks

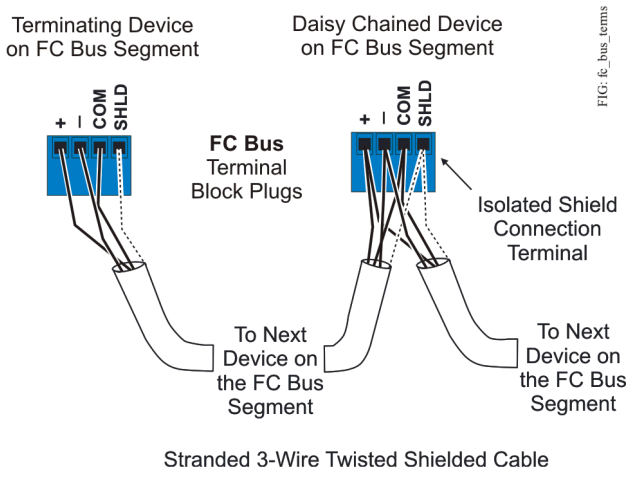
The input terminal blocks are mounted on the bottom of the expansion module and the output terminal blocks are mounted on the top of the expansion module. See Table 2 for more information about I/O terminal functions, requirements, and ratings.

SA/FC bus terminal block

An IOM can be connected to a Sensor/Actuator (SA) bus or a Field Controller (FC) bus, but not to both buses simultaneously. The SA/FC bus terminal block is a removable, 4-terminal plug that fits into a board-mounted jack.

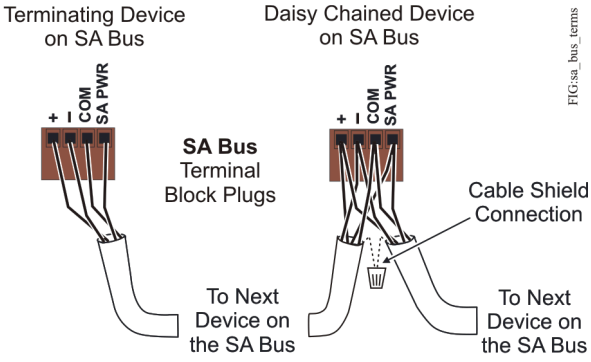
When connecting the IOM to an FC bus, wire the bus terminal block plugs on the expansion module, and the other controllers and expansion modules in a daisy-chain configuration using 3-wire twisted, shielded cable as shown in Figure 4.

Figure 4: FC bus terminal block wiring



When connecting the IOM to an SA bus, wire the bus terminal block plugs on the expansion module and other SA bus devices in a daisy-chain configuration using 4-wire twisted, shielded cable as shown in Figure 5.

Figure 5: SA bus terminal block wiring



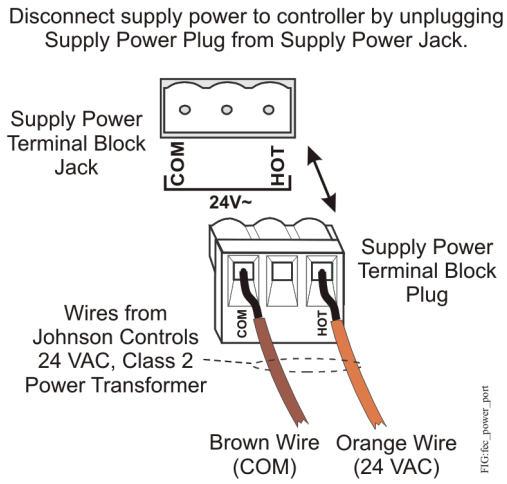
Note: The SA PWR/SHLD terminal does not supply 15 VDC. The SA PWR/SHLD terminal is isolated and can be used to connect (daisy chain) the 15 VDC power leads on the SA bus (Figure 5) or the cable shields on the FC bus (Figure 4). The SA bus supervisor supplies 15 VDC to devices on the SA bus requiring power.

Supply power terminal block

The 24 VAC supply power terminal block is a gray, removable, 3-terminal plug that fits into a board-mounted jack on the top right of the expansion module.

Wire the 24 VAC supply power wires from the transformer to the HOT and COM terminals on the terminal plug as shown in Figure 6. The middle terminal on the supply power terminal block is not used.

Figure 6: 24 VAC supply power terminal block wiring



Note: The supply power wire colors may be different on transformers from other manufacturers. Refer to the transformer manufacturer's instructions and the project installation drawings for wiring details.

Important: Connect 24 VAC supply power to the expansion module and all other network devices so that transformer phasing is uniform across the network devices. Powering network devices with uniform 24 VAC supply power phasing reduces noise, interference, and ground loop problems. The expansion module does not require an earth ground connection.

Terminal Wiring Guidelines, Functions, Ratings, and Requirements

Input and output wiring guidelines

Table 2 provides information and guidelines about the functions, ratings, and requirements for the expansion module input and output terminals, and references guidelines for determining proper wire sizes and cable lengths.

In addition to the wiring guidelines in Table 2, observe the following guidelines when wiring expansion module inputs and outputs:

- Run **all** low-voltage wiring and cables separate from high-voltage wiring.
- All input and output cables, regardless of wire size or number of wires, should consist of stranded, insulated, and twisted copper wires.
- Shielded cable is not required for input or output cables.
- Shielded cable is recommended for input and output cables that are exposed to high electromagnetic or radio frequency noise.
- Inputs/outputs with cables less than 30 m (100 ft) typically do not require an offset in the software setup. Cable-runs over 30 m (100 ft) may require an offset in the input/output software setup.

I/O Terminal blocks, ratings, and requirements

Table 2: I/O terminal blocks, functions, ratings, requirements, and cables

Terminal block label	Terminal label	Function, ratings, requirements	Determine wire size and maximum cable length
UNIVERSAL (Inputs)	**+15 V**	**15 VDC Power Source** for active (3-wire) input devices connected to the Universal IN*n* terminals. Provides 100 mA total current	Same as (Universal) **IN***n* **Note:** Use 3-wire cable for devices that source power from the +15 V terminal.
	IN*n*	**Analog Input - Voltage Mode (0–10 VDC)** 10 VDC maximum input voltage Internal 75k ohm Pull-down	See Guideline **A** in Table 3.
		Analog Input - Current Mode (4–20 mA) Internal 100 ohm load impedance **Note:** A current loop fail-safe jumper can be positioned to maintain a closed 4 to 20 mA current loop, even when the power to the expansion module is interrupted or off.	See Guideline **B** in Table 3.
		Analog Input - Resistive Mode (0–600k ohm) Internal 12 V. 15k ohm pull up Qualified Sensors: 0-2k ohm potentiometer, RTD (1k Nickel [Johnson Controls sensor], 1k Platinum, and A99B Silicon Temperature Sensor) Negative Temperature Coefficient (NTC) Sensor (10k Type L, 10k JCI Type II, 2.252k Type II)	See Guideline **A** in Table 3.
		Binary Input - Dry Contact Maintained Mode 1 second minimum pulse width Internal 12 V. 15k ohm pull up	See Guideline **A** in Table 3.
	ICOM*n*	**Universal Input Common** for all Universal Input terminals	Same as (Universal) **IN***n*
ANALOG (Outputs)	**OUT***n*	**Analog Output - Voltage Mode (0–10 VDC)** 10 VDC maximum output voltage 10 mA maximum output current Required an external load of 1,000 ohm or more. **Note:** The Analog Output (AO) operates in the Voltage Mode when connected to devices with impedances greater than 1,000 ohm. Devices that drop below 1,000 ohm may not operate as intended for Voltage Mode applications.	See Guideline **C** in Table 3.
		Analog Output - Current Mode (4–20 mA) Requires an external load between 0 and 300 ohm. **Note:** The Analog Output (AO) operates in the Current Mode when connected to devices with impedances less than 300 ohm. Devices that exceed 300 ohm may not operate as intended for Current Mode applications.	
	OCOM*n*	**Analog Output Signal Common** for all Analog OUT terminals.	

Cable and wire length guidelines

The following table defines cable length guidelines for the various wire sizes that may be used for wiring low-voltage (<30 V) input and outputs.

Table 3: Cable length guidelines

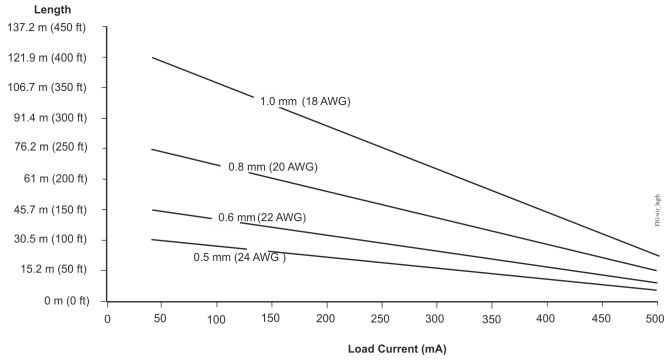
Guideline	Wire size/gauge and type	Maximum cable length and type	Assumptions
A	1.0 mm (18 AWG) stranded copper	457 m (1,500 ft) twisted wire	100 mV maximum voltage drop Depending on cable and the connected input or output device, you may have to define an offset in the setup software for the input or output point.
	0.8 mm (20 AWG) stranded copper	297 m (975 ft) twisted wire	
	0.6 mm (22 AWG) stranded copper	183 m (600 ft) twisted wire	
	0.5 mm (24 AWG) stranded copper	107 m (350 ft) twisted wire	
B	1.0 mm (18 AWG) stranded copper	229 m (750 ft) twisted wire	100 mV maximum voltage drop Depending on cable and the connected input or output device, you may have to define an offset in the setup software for the input or output point.
	0.8 mm (20 AWG) stranded copper	137 m (450 ft) twisted wire	
	0.6 mm (22 AWG) stranded copper	91 m (300 ft) twisted wire	
	0.5 mm (24 AWG) stranded copper	61 m (200 ft) twisted wire	
C	See Figure 7 to select wire size/gauge. Use stranded copper wire.	See Figure 7 to determine cable length. Use twisted wire cable.	N/A

Maximum cable length versus load current

Use the following figure to estimate the maximum cable length relative to the wire size and the load current (in mA) when wiring inputs and outputs.

Note: The following information applies to low-voltage (<30 V) inputs and outputs only.

Figure 7: Maximum wire length for low-voltage (<30 V) Inputs and Outputs by current and wire size



Communications bus and supply power wiring guidelines

Table 4 provides information about the functions, ratings, and requirements for the communication bus and supply power terminals; it additionally provides guidelines for wire sizes, cable types, and cable lengths when wiring the expansion module's communication buses and supply power.

In addition to the guidelines in Table 4, observe these guidelines when wiring an SA or FC bus and the 24 VAC supply power:

- Run **all** low-voltage wiring and cables separate from high-voltage wiring.
- All SA and FC bus cables, regardless of wire size, should be twisted, insulated, stranded copper wire.
- Shielded cable is strongly recommended for all SA and FC bus cables.
- Refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)* for detailed information regarding wire size and cable length requirements for the SA and FC buses.

Communications bus and supply power terminal blocks, ratings, and requirements

Table 4: Communications bus and supply power terminal blocks, functions, ratings, requirements, and cables

Terminal block/Port label	Terminal labels	Function, electrical ratings/Requirements	required cable type
FC BUS or **SA BUS**	**+** **-**	FC or SA Bus Communications	FC Bus: 0.6 mm (22 AWG) stranded, 3-wire twisted, shielded cable required. SA Bus: 0.6 mm (22 AWG) stranded, 4-wire (2 twisted-pairs), shielded cable required. ⓘ **Note:** On the SA Bus, the + and - wire are one twisted pair, and the COM and SA PWR are the second twisted pair of wires.
	COM	Signal Reference (Common) for FC or SA Bus communications	
	SHLD or **SA PWR**	**SHLD on FC Bus:** Isolated terminal (optional shield drain connection) **SA PWR on SA Bus:** 15 VDC power lead connection. ⓘ **Note:** The SA PWR terminal on an IOM expansion module does not supply 15 VDC. The SA bus supervisor supplies 15 VDC to devices on the SA bus requiring power.	
24~	**HOT**	24 VAC Power Supply - Hot Supplies 20–30 VAC (Nominal 24 VAC)	0.8 mm to 1.0 mm (18 AWG) 2-wire
	COM	24 VAC Power Supply - Common	

ⓘ **Note:** See to determine wire size and cable lengths for cables.

ⓘ **Note:** The SA Bus and FC Bus wiring recommendations in this table are for MS/TP bus at 38,400 baud. For more information, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

Termination details

A set of Johnson Controls termination diagrams provides details for wiring inputs and outputs to the controllers.

See the figures in this section for the applicable termination diagrams.

Table 5: Termination details

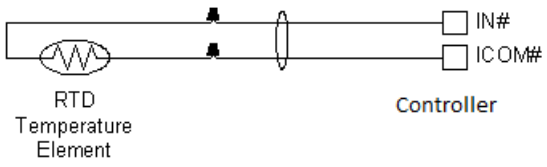
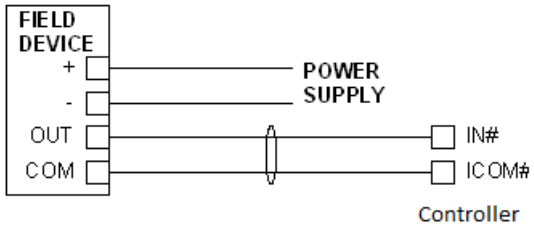
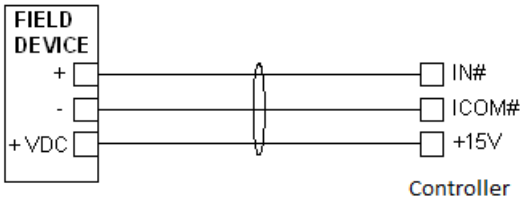
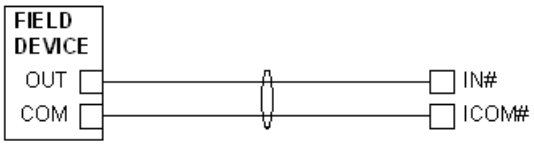
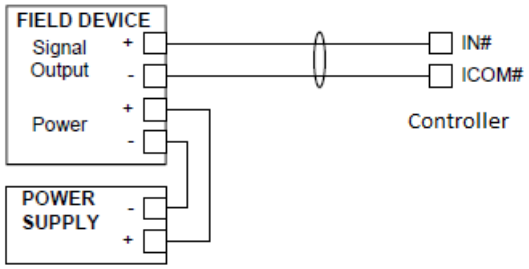
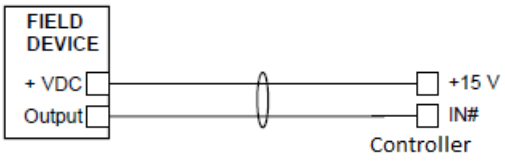
Type of field device	Type of Input/ Output	Termination diagrams
Temperature Sensor	UI	
Voltage Input - External Source	UI	
Voltage Input - Internal Source	UI	
Voltage Input (Self-Powered)	UI	
Current Input - External Source (Isolated)	UI	
Current Input - Internal Source (2-wire)	UI	

Table 5: Termination details

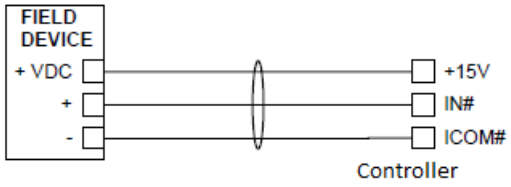
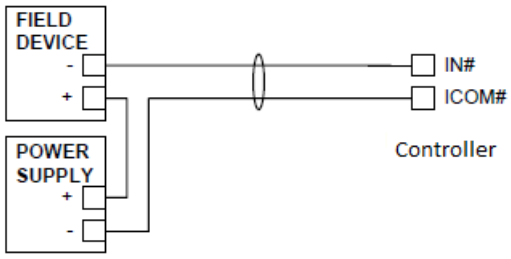
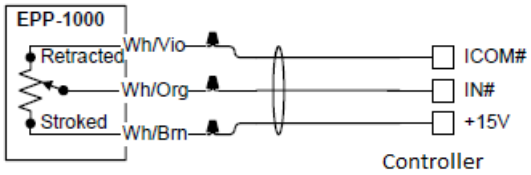
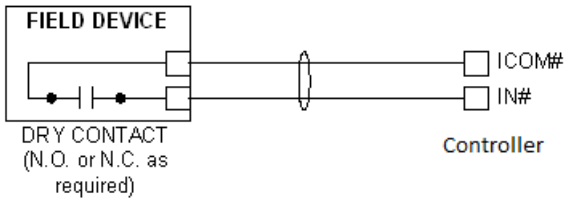
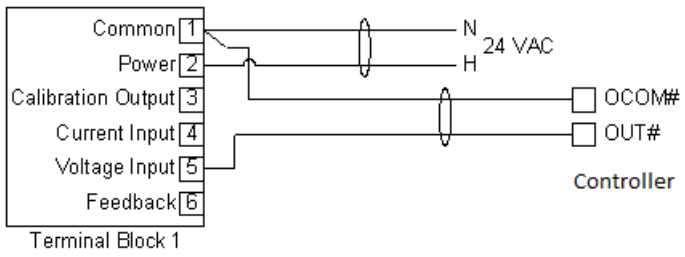
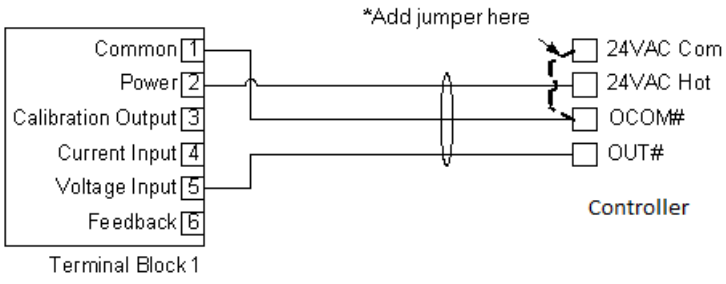
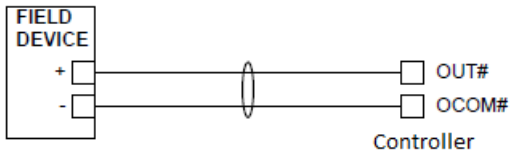
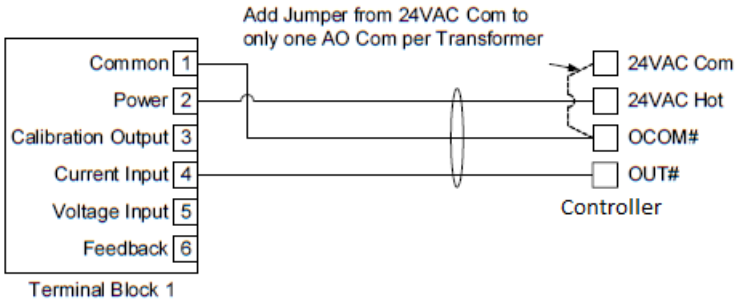
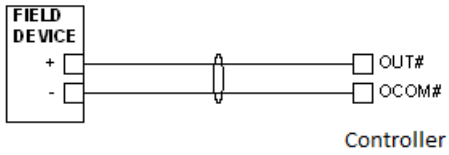
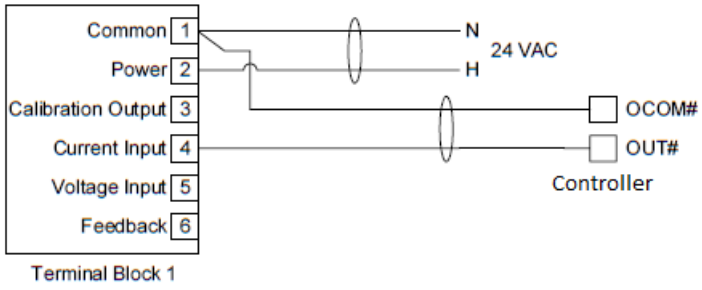
Type of field device	Type of Input/ Output	Termination diagrams
Current Input - Internal Source (3-wire)	UI	
Current Input - External Source (in Loop)	UI	
Feedback from EPP-1000	UI	
Dry Contact (Binary Input)	UI	
0–10 VDC Output to Actuator (External Source)	AO	
0–10 VDC Output to Actuator (Internal Source)	AO	

Table 5: Termination details

Type of field device	Type of Input/ Output	Termination diagrams
Analog Output (Current)	AO	
4–20 mA Output to Actuator	AO	
Voltage (Analog Output)	AO	
4–20 mA Output to Actuator	AO	

Setup and Adjustments

Setting the device address

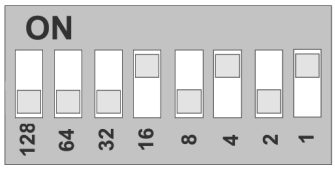
Metasys expansion modules are master devices on MS/TP (SA or FC) buses. Before operating expansion modules on a bus, you **must** set a valid and unique device address for each expansion module on the bus. You set an expansion module's device address by setting the positions of the switches on the DIP switch block at the top of the expansion module. Device addresses 4 through 127 are the valid addresses for these expansion modules.
The following table describes the FC bus and SA bus device addresses for Johnson Controls MS/TP communications bus applications:

Table 6: SA/FC bus device address descriptions

Device address	Use on description
0 (Switch 128 Off)	Reserved for FC Bus Supervisory Controller (not for use on controllers or expansion modules).
1 to 3 (Switch 128 Off)	Reserved for peripheral devices (not for use on controllers or expansion modules).Reserved for FC Bus Supervisory Controller (not for use on expansion modules).
4 to 127 (Switch 128 Off)	Used for MS/TP master devices (controllers or expansion modules) that are hardwired to an SA Bus or FC Bus.

The DIP switch block has eight switches numbered 128, 64, 32, 16, 8, 4, 2, and 1. Switches 64 through 1 are device address switches. Switch 128 must be set to off for all hard-wired SA and FC bus applications.

Figure 8: Device address DIP switch block set to address 21



Note: *Metasys*® field controllers ship with switch 128 ON and the remaining address switches off rendering the controllers wired subordinate devices, which do not operate on MSTP buses, but do not interfere with bus operation. Set a valid and unique device address on the expansion module before applying power to the expansion module on the bus.

To set the device addresses on *Metasys* expansion modules, complete the following steps:

1. Set **all** of the switches on the address DIP switch block (128 through 1) to OFF.
2. Set one or more of the seven address switches (64 though 1) to ON, so that the sum of the switch numbers set to ON equals the intended device address, and ensure that switch 128 remains set to OFF.

Note: To do this, set the highest number switch that is less than or equal to the intended device address to ON. Then continue setting lower numbered switches until the total equals the intended address. For example, if the intended device address is 21, set switches 16, 4, and 1 to ON (16+4+1= 21) and all other switches to OFF.

3. Set a unique and sequential device address for each of the expansion modules connected on the SA or FC bus starting with device address 4.

Note: To ensure the best bus performance, set sequential device addresses with no gaps in the device address range (4, 5, 6, 7, 8, 9, and so on). The expansion modules do **not** need to be physically connected on the bus in their numerical device address order

4. Write each expansion module's device address on the white label below the DIP switch block on the expansion module's cover.

Removing the expansion module cover

Important: Electrostatic discharge can damage expansion module components. Use proper electrostatic discharge precautions during installation, setup, and servicing to avoid damaging the expansion module.

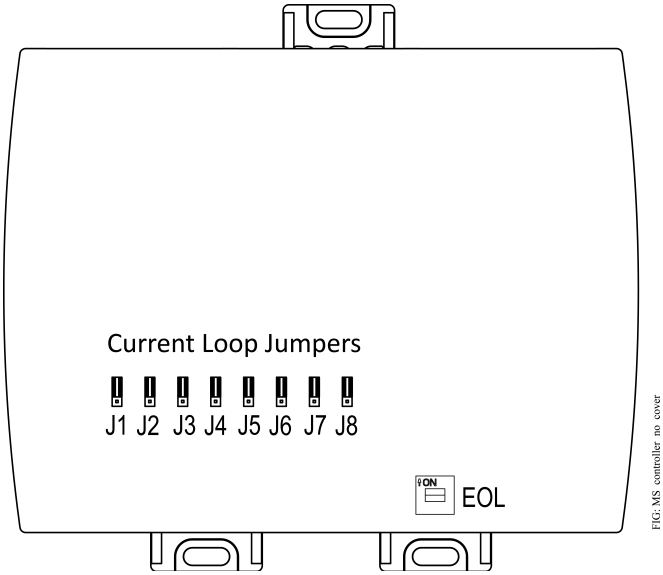
Important: Disconnect all power sources to the expansion module before removing cover and changing the position of any jumper or the EOL switch on the expansion module. Failure to disconnect power before changing a jumper or EOL switch position can result in damage to the expansion module and void any warranties.

The expansion module cover is held in place by four plastic latches that extend from the base and snap into slots on the inside of the housing cover.

To remove the expansion module cover, complete the following steps:

1. Place your fingernails under the two cover lift tabs (Figure 1) on the sides of the housing cover and gently pry the top of the cover away from the base to release the cover from the two upper latches.
2. Pivot the top of the cover further to release it from the lower two latches.
3. Replace the cover by placing it squarely over the base, and then gently and evenly push the cover on to the latches until they snap into the latched position.

Figure 9: Controller with cover removed



Setting the End-of-Line (EOL) switch

Each expansion module has an EOL switch. When the EOL switch is set to ON, it sets the expansion module as a terminating device on the bus. See Figure 10 for the EOL switch location. The default EOL switch position is OFF.

Figure 10: End-of-Line switch positions

To set the EOL switch on an expansion module, complete the following steps:

1. Determine the physical location of the expansion module on the SA or FC bus.
2. Determine if the expansion module must be set as a terminating device on the bus.

Note: The EOL termination rules for SA buses and FC buses are different. Refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)* for detailed information regarding EOL termination rules and EOL switch settings on SA and FC buses.

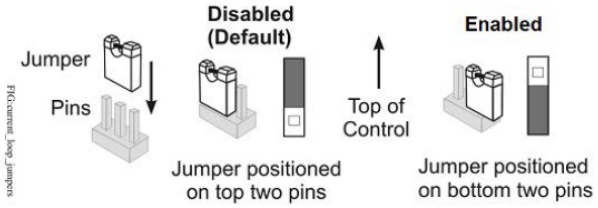
3. If the expansion module is a terminating device on the FC bus, set the EOL switch to ON. If the expansion module is not a terminating device on the bus, set the EOL switch to OFF.

When an expansion module is connected to power with its EOL switch set to ON, the amber EOL LED on the expansion module cover is lit.

UI current loop jumpers

The UI current loop fail-safe jumpers are on the circuit board under the expansion module cover near the UI terminals. When a UI is defined (in the system software) as a 4 to 20 mA Analog Input and the UI's current loop jumper is in the Disabled (default) position (Figure 11), the 4 to 20 mA current loop circuit opens whenever power to the expansion module is interrupted or off.

Figure 11: Current loop jumper positions



Setting the current loop jumper to the Enabled position (Figure 11) connects an internal 100 ohm resistor across the UI terminals, which maintains the 4 to 20 mA current loop circuit even when power to the expansion module is interrupted or off.

Important: Current Loop jumpers must be in the Disabled (default) position for all UIs that are not set up to operate as 4 to 20 mA analog inputs.

Table 7: UI Inputs and Jumper Labels

Universal Input Label	Jumper Label on Circuit Board Label
IN1	J1
IN2	J2
IN3	J3
IN4	J4
IN5	J5
IN6	J6
IN7	J7
IN8	J8

Commissioning

You commission expansion modules with Controller Configuration Tool (CCT) software, using a Bluetooth Wireless Commissioning Converter (BTCVT), through Mobile Access Portal (MAP) Gateway at version 4.2 or above, or in BACnet router mode when connected to a Supervisory Controller. Refer to the *Controller Tool Help (LIT-12011147)* for detailed information on commissioning expansion modules.

Note: The MAP Gateway serves as a replacement for the BTCVT, which is no longer available for purchase, but continues to be supported.

Firmware Package File

The MS-FCP-0 equipment controller firmware package files are required for CCT to configure and commission the controllers. The firmware package files also allow you to upgrade an existing controller to the latest firmware release available for that controller.

Beginning at CCT Release 13, the firmware package files are orderable separately; they are not included with CCT. They are obtained from the *Metasys* software licensing portal, and are loaded and licensed on the computer/server that is running CCT.

For additional information about the firmware package files, refer to the *CCT Installation Instructions (LIT-12011259)*.

Troubleshooting

Observe the Status LEDs on the front of the expansion module. Table 8 provides LED status indicator information for troubleshooting the expansion module.

Table 8: Status LEDs and description of LED states

LED label	LED color	Normal LED state	Description of LED states
POWER	Green	On Steady	Off Steady = No Supply Power or the expansion module's polyswitch/resettable fuse is open. Check Output wiring for short circuits and cycle power to expansion module. On Steady = Power Connected
FAULT	Red	Off Steady	Off Steady = No Faults On Steady = Device Fault Blink - 2 Hz = Download or Startup in progress, not ready for normal operation
SA/FC BUS	Green	Blink - 2 Hz	Blink - 2 Hz = Data Transmission (normal communication) Off Steady = No Data Transmission (N/A - auto baud not supported) On Steady = Communication lost, waiting to join communication ring
EOL	Amber	Off (Except on terminating devices)	On Steady = EOL switch in ON position Off Steady = EOL switch in OFF position

Repair information

If an expansion module fails to operate within its specifications, replace the expansion module. For a replacement expansion module, contact your Johnson Controls representative.

Accessories

See the following table for expansion module accessories ordering information.

Table 9: Accessories Ordering Information

Product Code Number	Description
Mobile Access Portal (MAP) Gateway	Refer to the *Mobile Access Portal Gateway Catalog Page (LIT-1900869)* to identify the appropriate product for your region. ⓘ **Note:** The MAP Gateway serves as a replacement for the BTCVT, which is no longer available for purchase, but continues to be supported.
TL-CCT-0	*Metasys* Controller Configuration Tool (CCT) Software
MS-FCP-0	*Metasys* Field Controller Firmware Package Files for CCT
TP-2420	Transformer, 120 VAC Primary to 24 VAC secondary, 20 VA, Wall Plug
Y65T31-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount, 8 in. Primary Leads and Secondary Screw Terminals, Class 2 ⓘ **Note:** Additional Y6x-x Series transformers are also available. Refer to the *Series Y63, Y64, Y65, Y66, and Y69 Transformers Product Bulletin (LIT-125755)* for more information.
AS-CBLTSTAT	Cable adapter for connection to 8-pin TE-6700 Series sensors
AS-XFR050-0	Power transformer (Class 2, 24 VAC, 50 VA maximum output), no enclosure
AP-TBK4SA-0	Replacement SA Bus Terminal Blocks, 4-Position, Brown, Bulk Pack of 10
AP-TBK4FC-0	Replacement FC Bus Terminal Blocks, 4-Position, Blue, Bulk Pack of 10
AP-TBK3PW-0	Replacement Power Terminal Blocks, 3-Position, Gray, Bulk Pack of 10

Technical specifications

Table 10: IOM2723 technical specifications

Product Code Number	MS-IOM2723-0 Input/Output Module ⓘ **Note:** This model is only available in certain regions. Contact your local Johnson Controls representative for more information.
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
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
Addressing	DIP switch set; valid expansion module device addresses 4–127 (Device addresses 0–3 and 128–255 are reserved and not valid expansion module addresses)
Communications Bus	**BACnet MS/TP, RS-485:** 3-wire FC Bus between the supervisory controller and other controllers or expansion modules (for MS/TP bus communications at 38,400 baud) 4-wire SA Bus between expansion module, network sensors and other sensor/actuator devices, includes a lead to source 15 VDC supply power (from controller or expansion modules) to bus devices (for MS/TP bus communications at 38,400 baud)
Processor	RX631 Renesas® 32-bit microcontroller
Memory	4 MB external serial flash memory and 768 KB internal flash and 128 KB internal RAM
Input and Output Capabilities	**8 - Universal Inputs:** Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact **2 - Analog Outputs:** Defined as 0–10 VDC or 4–20 mA
Analog Input and Output Resolution and Accuracy	**Input:** 15-bit resolution **Output:** 15-bit resolution, +/-200 mV accuracy in 0–10 VDC applications
Terminations	**Input/Output:** Fixed Screw Terminal Blocks **SA/FC Bus and Supply Power:** 4-Wire and 3-Wire Pluggable Screw Terminal Blocks
Mounting	Horizontal on single 35 mm DIN rail mount (preferred), or screw mount on flat surface with three integral mounting clips on expansion module
Housing	**Enclosure material:** ABS and polycarbonate UL94 5VB; self-extinguishing, plenum-rated Protection Class: IP20 (IEC529)
Dimensions (Height x Width x Depth)	150 mm x 164 mm x 53 mm (5-7/8 in. x 6-1/2 in. x 2-1/8 in.) including terminals and mounting clips ⓘ **Note:** Mounting space requires an additional 50 mm (2 in.) on top, bottom, and front face of expansion module for easy cover removal, ventilation, and wire terminations.
Weight	0.5 kg (1.1 lb)
Compliance CE	**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
	Europe: Johnson Controls 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 International Compliance	**BACnet International:** BACnet Testing Laboratories (BTL) Protocol Revision 15 Listed and Certified BACnet Smart Actuator (B-SA)

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.

Product warranty

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

Single point of contact

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIJANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS WESTENDHOF 3 45143 ESSEN GERMANY	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

For more contact information, refer to www.johnsoncontrols.com/locations.