

MS-BACEOL-0 RS485 End-of-Line Terminator

Installation Instructions

MS-BACEOL-0

Part No. 24-10264-4, Rev. B

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Application

The MS-BACEOL-0 RS485 End-of-Line (EOL) Terminator (Figure 1) provides EOL termination on Metasys® RS485 protocol Field Controller (FC) and N2 Bus segments when the terminating field device does not have integral EOL termination capability.

The EOL is a compact, lightweight, module wrapped in protective cover that can be quickly installed in the field in a variety of ways. The EOL connects directly to the terminating device on a bus segment with the attached wire leads. The EOL requires 24 VAC, Class 2 power supplied by the field device or other 24 VAC source.

An EOL is **required** in all Metasys Master-Slave/Token-Passing (MS/TP) applications wherever a terminating device on an FC Bus segment does not have integral EOL termination (for example, TEC2600 Series thermostats and third-party MS/TP devices without integral EOL capability [Figure 2]).

An EOL can enhance N2 performance and is **recommended** on N2 Buses wherever the terminating device on a bus segment does not have integral EOL termination.

The EOL is designed for Metasys RS485 buses and provides better FC Bus performance than the integral EOL termination on third-party devices. An EOL is **recommended** wherever a third-party device terminates an FC Bus segment.

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 is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her 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

Parts Included

- one MS-BACEOL-0 RS485 EOL Terminator
- two strips of two-side adhesive foam tape

Dimensions

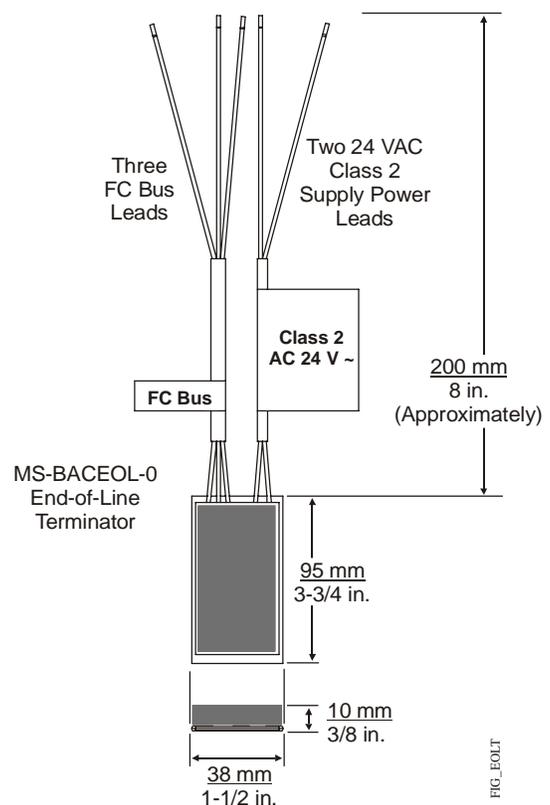


Figure 1: MS-BACEOL-0 RS485 End-of-Line Terminator Dimensions

Mounting

IMPORTANT: Before installing the MS-BACEOL-0 RS485 EOL Terminator in plenum applications, verify acceptance of exposed plastic materials in plenum areas with the local building authority. Building codes for plenum requirements vary by location. Some local building authorities accept compliance to UL 1995, Heating and Cooling Equipment, whereas others use different acceptance criteria.

Location Considerations

Consider the following when locating the EOL terminator:

- Observe the ambient operating conditions in the [Technical Specifications](#) on page 4.
- Only mount the EOL indoors (or in a panel or enclosure where the ambient operating conditions are maintained).
- Do not mount the EOL near high-voltage wires, high-voltage equipment, or radio transmitting devices that may produce interference.
- Do not mount the EOL on hot surfaces, surfaces that condense water, or surfaces prone to vibration such as duct work.

- Do not mount the EOL in areas where environmental contaminants, such as corrosive vapors or airborne particulates, are present.

Mounting Considerations

The EOL terminator may be field mounted in a variety of ways. Consider the following when mounting the EOL:

- It is recommended that the EOL terminator be installed in an electrical wallbox, handi-box, enclosure, or panel.
- The wire leads can support the weight of the EOL (only), but it is recommended that EOL be secured to a suitable support.
- The EOL can be attached to a suitable support (such as a DIN rail) using the foam tape provided or with a user-supplied cable tie-wrap.
- On room sensor and thermostat applications, install an adequate amount of fire-resistant insulation to plug the hole where the wires pass through the sensor or thermostat base and wall to reduce temperature infiltration from the wall cavity to the sensor.

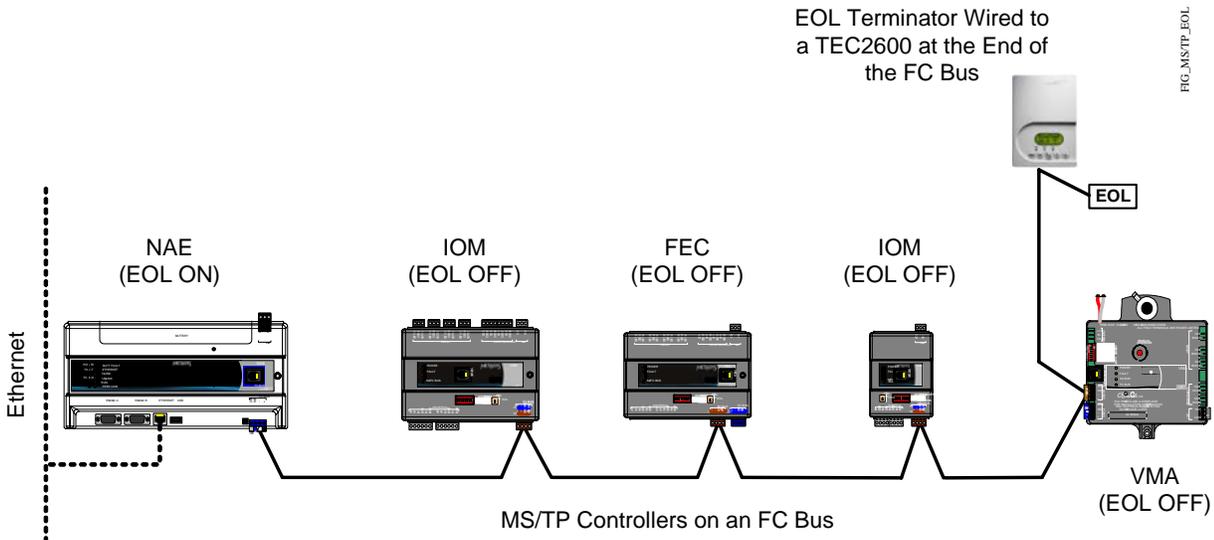


Figure 2: EOL Terminator Connected to a TEC2600 Series Thermostat to Provide End-of-Line Termination on an FC Bus

Wiring



CAUTION: Risk of Electric Shock

Disconnect power supply before making electrical connections to avoid electric shock.

IMPORTANT: Do not connect 24 VAC supply power to the EOL Terminator before wiring is complete.

IMPORTANT: Use copper conductors only. Ensure all wiring is in accordance with local, national, and regional regulations.

IMPORTANT: The EOL Terminator is a low-voltage (<30 VAC) device. Do not exceed the EOL Terminator electrical ratings.

IMPORTANT: Prevent any static electric discharge to the EOL Terminator. Static electric discharge can damage the EOL Terminator and void any warranties.

Observe the following guidelines when wiring the EOL terminator:

- The EOL terminator is designed for N2 and MS/TP trunks on Metasys RS485 Buses. Connect the EOL terminator to **only** N2 or MS/TP trunks on Metasys RS485 FC Buses.
- Connect the EOL terminator to N2 or MS/TP devices that terminate Metasys bus segments and do not have integral EOL termination capability.
- When a third-party device terminates a Metasys FC Bus segment, it is recommended that any EOL termination on the third-party be disabled and an EOL terminator be installed to provide EOL termination on the bus segment.
- When the third-party (terminating) device has only the + and - terminals (no REF or COM), isolate and insulate the blue REF lead on the EOL (Figure 3).

Connect the EOL FC Bus leads to the appropriate FC or N2 Bus terminals on the bus terminating device (Figure 3).

Connect the EOL 24 VAC power supply leads to a dedicated or surged protected 24 VAC, Class 2 power supply (Figure 3).

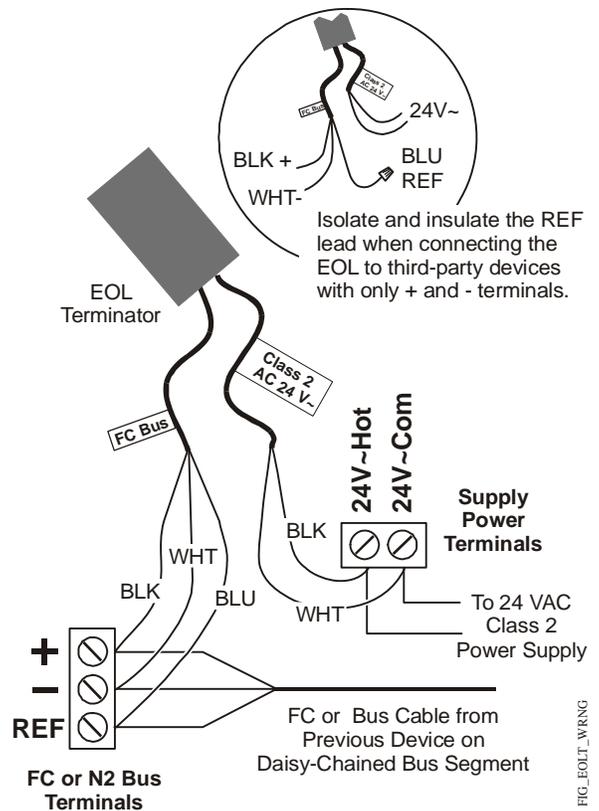


Figure 3: Wiring the EOL Terminator to a Bus-Terminating Device

Troubleshooting

An improperly wired or malfunctioning EOL terminator may result in loss of network communication or poor performance on the RS485 bus. To troubleshoot the EOL terminator:

1. Check the supply voltage to the EOL to ensure that the voltage is between 18 and 30 VAC:
 - If the supply voltage is between 18 and 30 VAC, proceed to Step 2.
 - If the voltage is <18 or >30 VAC, troubleshoot the supply power source and bring the supply voltage into the required range, then proceed to Step 2.

2. With the EOL connected to 24 VAC power **and** the FC Bus leads disconnected, check the voltage drop between the REF and FC+ leads and between the REF and FC- leads:

- **REF to FC+** should be **2.7 to 3.2 VDC**
- **REF to FC-** should be **2.3 to 2.7 VDC**

If the EOL voltages are within these ranges, the EOL is operating properly and is not a source of communication or performance problems on the bus.

If the EOL voltages are out of either of these ranges, replace the EOL terminator.

3. Reconnect a properly operating EOL terminator to the 24 VAC, Class 2 (network) power source.

If network communication or performance problems persist, continue troubleshooting the RS485 bus.

Refer to the *ASC and N2 Bus Networking and Troubleshooting Guide (LIT-6363003)* and the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)* for more information.

Repair Information

If the MS-BACEOL-0 RS485 EOL Terminator fails to operate within its specifications, replace the device. For a replacement EOL terminator, contact the nearest Johnson Controls® representative.

Technical Specifications

MS-BACEOL-0

Product Code	MS-BACEOL-0 RS485 End-of-Line Terminator
Power Requirements	24 VAC, Class 2 Supply Power, 1.2 VA Maximum
Wiring Terminations and Network Interfaces	Power: Two 200 mm (8 in.) 22 AWG wire leads for 24 VAC supply power connections Network: Three 200 mm (8 in.) 22 AWG wire leads for RS485 Bus connections
Ambient Operating Temperature	-20 to 70°C (-4 to 158°F)
Ambient Operating Humidity	<90% Non-condensing
Ambient Storage Temperature	-40 to 70°C (-40 to 158°F)
Ambient Storage Humidity	<95% Non-condensing
Dimensions	70 x 38 x 10 mm (2-3/4 x 1-1/2 x 3/8 in.) with five 20 cm (8 in.) 20 AWG wire leads
Shipping Weight	40.0 g (1.4 oz)
Compliance	<p>United States: UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment. FCC Compliant to CFR 47, Part 15, Subpart B, Class A</p> <p>Canada: UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment. Industry Canada Compliant, ICES-003</p> <p>Europe: CE Mark, EMC Directive 89/336/EEC, in accordance with EN 50081-1, Class B, Generic emission standard for residential, commercial and light industry, and EN 50082-2/EN 61000-6-2, Generic immunity standard for heavy industrial environment</p> <p>Australia and New Zealand: C-Tick Mark, Australia/New Zealand Emissions Compliant</p>



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