

Excel 10

W7761A REMOTE INPUT/OUTPUT DEVICE

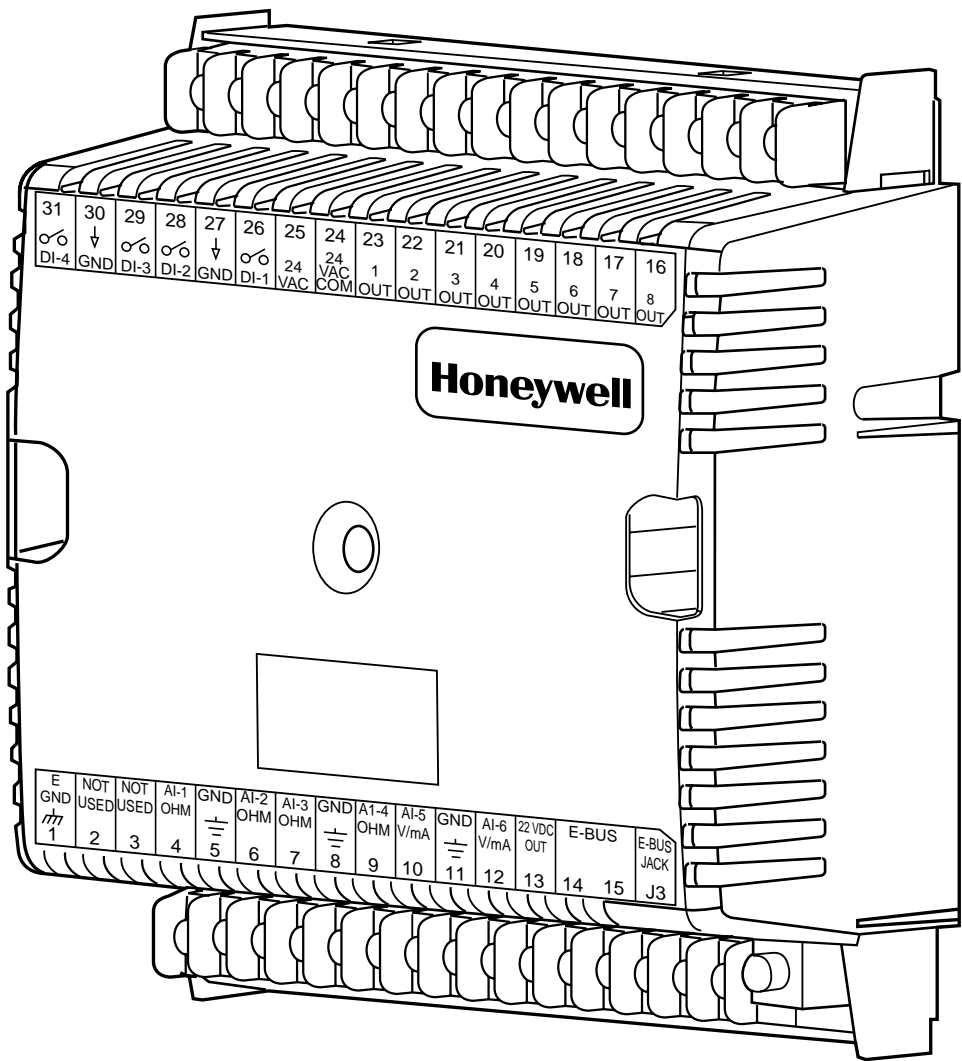


INSTALLATION INSTRUCTIONS

PRODUCT DESCRIPTION

The W7761A Remote Input/Output (RIO) Device, is a Free Topology Transceiver (FTT) LonMark® compliant device in the Excel 10 family product line. This device can be

used to monitor/control HVAC equipment, lighting, and other miscellaneous loads in a distributed network. The device is field-mounted to the equipment that it controls, and the device wiring is attached to the screw terminals located on the device. See Fig. 1.



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Fig. 1. Excel 10 W7761A Remote I/O Device.



The W7761A Device communicates via the 78 kilobaud Echelon® LonWorks® E-Bus Network.

For the W7761A, any hardware driven by the Triac outputs must have a minimum current draw, when energized, of 25 mA and a maximum current draw of 500 mA.

INSTALLATION

Mount the W7761A in a position that allows clearance for wiring, servicing and device removal. Avoid mounting the W7761A in areas where acid fumes or other deteriorating vapors can attack the metal parts of the device, or in areas

where escaping gas or other explosive vapors are present. See Fig. 2 for mounting dimensions.

The enclosure on the W7761A is constructed of a sheet metal housing and a plastic factory-snap-on cover. The device mounts using two screws inserted through the plastic cover. Use screws appropriate for the mounting surface. The W7761A can be mounted in any orientation. Ventilation openings were designed into the cover to allow proper heat dissipation regardless of the mounting orientation.

The W7761A can also be mounted using DIN rail (obtain locally). If using DIN rail also purchase from Augat Inc. part number 2TK2D DIN rail (adapter) two each, see Fig. 3.

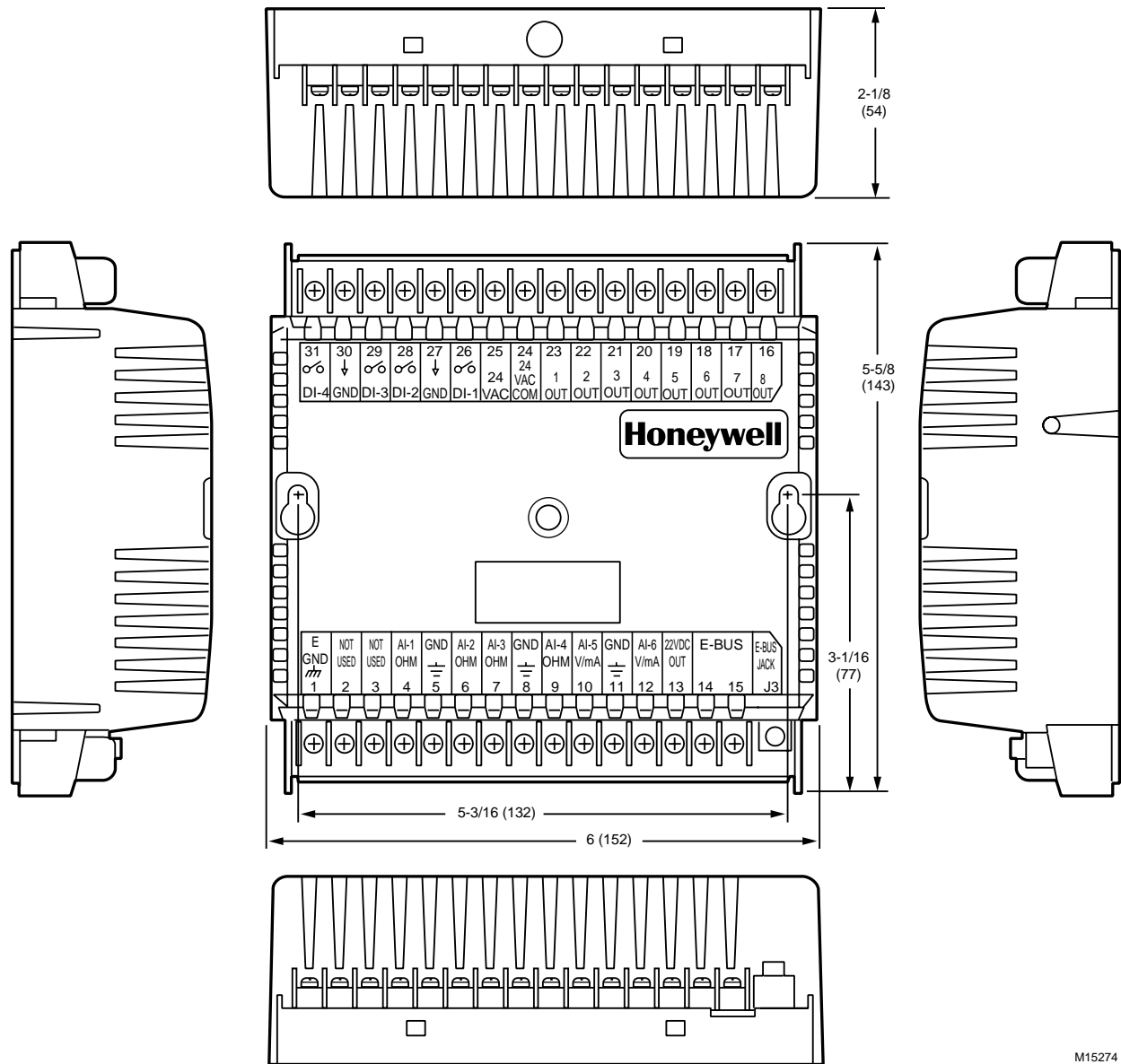
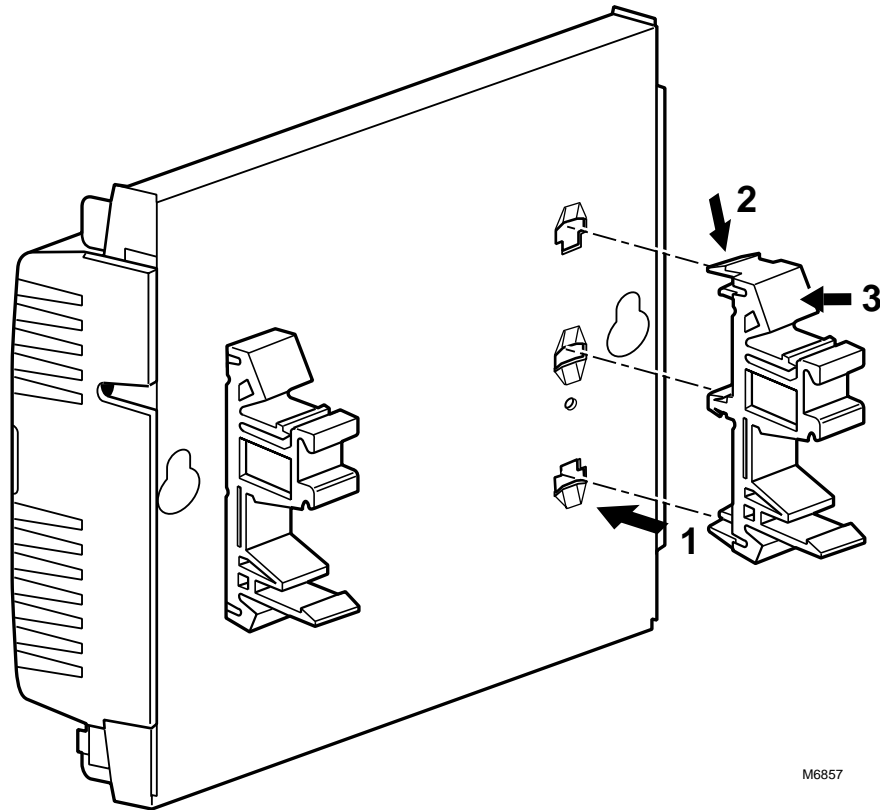


Fig. 2. W7761A mounting dimensions in in. (mm).

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Fig. 3. W7761A DIN rail mounting.

Wiring

All wiring must comply with applicable electrical codes and ordinances or as specified on installation wiring diagrams. Device wiring on the W7761A is terminated to the screw terminal blocks located on the top and the bottom of the device.

NOTES:

- For multiple devices operating from a single transformer, the same side of the transformer secondary must be connected to the same power input terminal in each device. The ground terminal (1 on the W7761A) must be connected to a verified earth ground for each device in the group, see Fig. 5. (Device configurations are not necessarily limited to three devices, but the total power draw including accessories cannot exceed 100 VA when powered by the same transformer (U.S. only). See System Engineering form 74-2699 for power wiring recommendations.
- All loads on an Excel 10 W7761A Device must be powered by the same transformer that powers the Excel 10 RIO Device.
- Keep the earth ground connection (terminal 1) wire run as short as possible. Refer to Fig. 9 through 13.
- Do *not* connect the analog or digital ground terminals (5, 8, 11, 27 and 30) to earth ground. Refer to Fig. 9 through 13.

Power

The 24 Vac power from an energy limited Class II Power Source must be provided to each W7761A Device. To conform to Class II restrictions, transformers must not be larger than 100 VA (U.S. only). A transformer that meets CE mark requirements and that meets the Low Voltage Directive (LVD) requirements must be used in Europe for all installations of this product. More than one W7761A can be powered by a single transformer. Fig. 4 shows power wiring details for a single device and Fig. 5 depicts multiple devices using one transformer.

IMPORTANT

Use the heaviest gauge wire available, up to 14 AWG (2.0 mm²) with a minimum of 18 AWG (1.0 mm²), for all power and earth ground wiring.

Screw type terminal blocks are designed to accept up to two 14 AWG (2.0 mm²) conductors, one on each side of the terminal screw. More than two wires that are 14 AWG (2.0 mm²) can be connected with a wire nut. Include a pigtail with this wire group and attach the pigtail to one side of the terminal block.

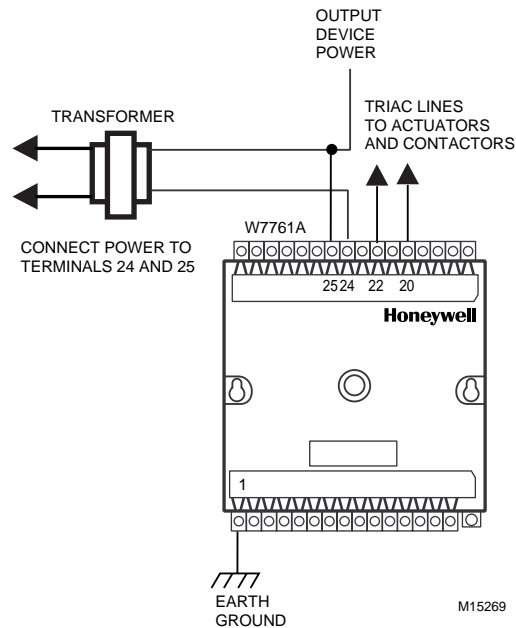


Fig. 4. Power wiring details for one Excel 10 per transformer.

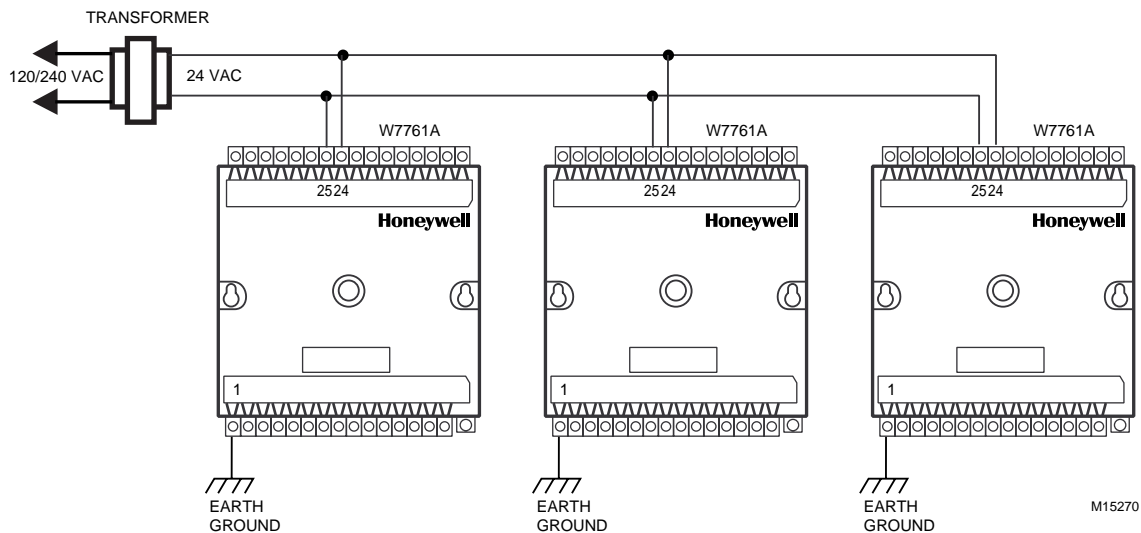


Fig. 5. Power wiring details for two or more Excel 10s per transformer.

NOTES:

- Unswitched 24 Vac power wiring can be run in the same conduit as the E-Bus cable.
- Maintain at least a three-inch (76 millimeter) separation between Triac outputs and E-Bus wiring throughout the installation.

See the following **IMPORTANT** on **Heating and Cooling Equipment (UL 1995, U.S. only)**.

IMPORTANT

*If the W7761 Device is used on **Heating and Cooling Equipment (UL 1995, U.S. only)** and the transformer primary power is more than 150 volts, connect the transformer secondary to earth ground, see Fig. 6. For these applications, only one Excel 10 device can be powered by each transformer.*

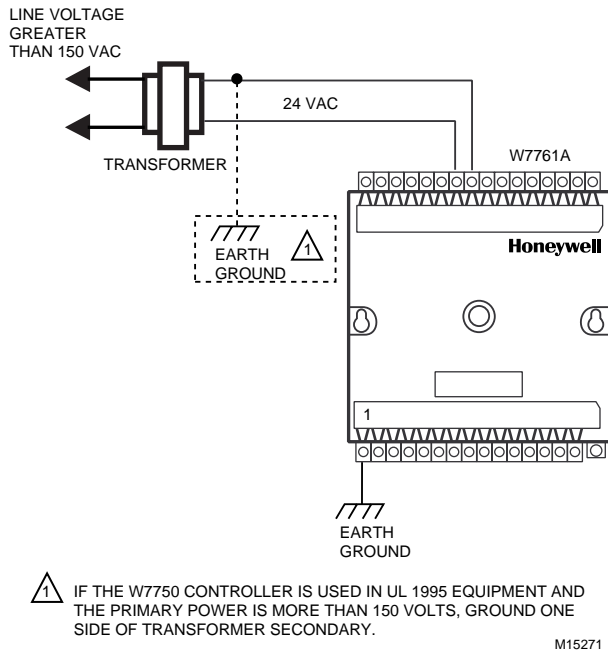


Fig. 6. Transformer power wiring details for one Excel 10 used in UL 1995 equipment (U.S. only).

Communications

Refer to E-Bus Wiring Guidelines form, 74-2865 for a complete description of E-Bus network topology rules. Approved cable types for E-Bus communications wiring is Level IV 22 AWG (0.34 mm²) plenum or non-plenum rated unshielded, twisted pair, solid conductor wire. For nonplenum areas, U.S. part AK3781 (one pair) or U.S. part AK3782 (two pair) can be used. In plenum areas, U.S. part AK3791 (one pair) or U.S. part AK3792 (two pair) can be used. Communications wiring can be run in a conduit, if needed, with *non-switched* 24 Vac or sensor wiring. If a longer E-Bus network is required, a Q7740A 2-way or Q7740B 4-way repeater can be added to extend the length of the E-Bus. Also a Q7751A Router can be added to partition the system into two segments and effectively double the length of the E-Bus. Only one router is allowed with each Excel 10 Zone Manager, and each network segment can have a maximum of one repeater.

Pull the cable to each device on the E-Bus and connect to communication terminals 14 and 15 on the W7761A.

IMPORTANT

Notes on Communications Wiring:

- All field wiring must conform to local codes and ordinances (or as specified on the installation drawings).
- Approved cable types for E-Bus communications wiring is Level IV 22 AWG (0.34 mm²) plenum or non-plenum rated unshielded, twisted pair, solid conductor wires. For nonplenum areas, U.S. part AK3781 (one pair) or U.S. part AK3782 (two pair) can be used. In plenum areas, U.S. part AK3791 (one pair) or U.S. part AK3792 (two pair) can be used.
- Unswitched 24 Vac power wiring can be run in the same conduit as the E-Bus cable.
- Do not bundle output wires with sensor, digital input or communications E-Bus wires.
- Do not use different wire types or gauges on the same E-Bus segment. The step change in line impedance characteristics would cause unpredictable reflections on the E-Bus. When using different wire types is unavoidable, use a Q7751A Router at the junction.
- In noisy (high EMI) environments, avoid wire runs parallel to noisy power cables, motor control centers, or lines containing lighting dimmer switches, and keep at least 3 in. (76 mm) of separation between noisy lines and the E-Bus cable.
- Each daisy-chained E-Bus segment that is on one side of a Q7751A,B Router (can contain up to 60 Excel 10s) and has a length greater than 1640 ft. (500m) must have two E-Bus 209541B Termination Modules, one at each end of the daisy-chain wiring run.
- Make sure that neither of the E-Bus wires is grounded.

NOTE: If a 209541B Termination Module is required at a the RIO device, connect two of the three termination module wires to the E-Bus terminals. Selecting the appropriate two wires depends on the E-Bus network topology. Refer to the E-Bus Wiring Guidelines form, 74-2865, and the Excel 10 FTT Termination Module Installation Instructions form, 95-7554. For example, using a doubly terminated daisy-chained bus topology, if devices are on either end of an E-Bus wire run, mount the termination module on the appropriate terminals as shown in Fig. 7.

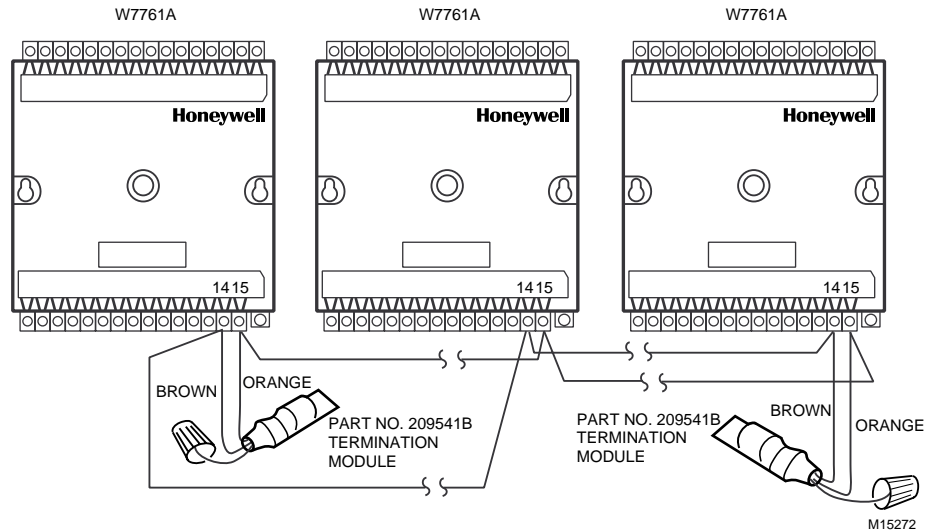


Fig. 7. Termination modules (place a wire nut on each remaining wire that is not connected to a controller or device).

NOTE: When two or more wires are to be attached to the same terminal, other than 14 AWG (2.0 mm²), be sure to twist them together. Deviation from this rule can result in improper electrical contact. See Fig. 8.

Wire to the terminal blocks as follows:

1. For single conductors being inserted into one terminal location, strip 3/8 in. (5 mm) of insulation from the conductor.
2. Insert the wire in the required terminal location and tighten the screw to complete the termination.
3. If two or more wires are being inserted into one terminal location, strip 1/2 in. (13 mm) of insulation from the conductors then twist the wires together a minimum of three turns before inserting them.
4. Cut the twisted end of the wires to 3/16 in. (5 mm) before inserting them into the terminal and tightening the screw.
5. Pull on each wire in all terminals to check for good mechanical connection.

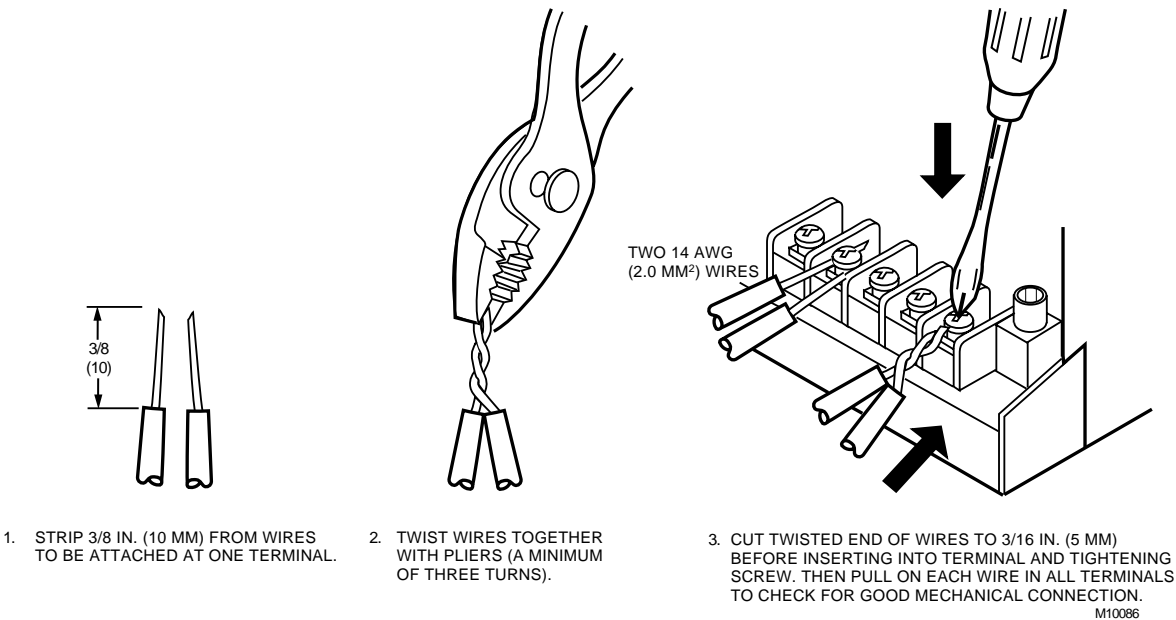


Fig. 8. Attaching two or more wires at terminal blocks.

Wiring Details

The W7761A Device has the terminal arrangement shown in Fig. 9 through 13. Connection for operator access to the E-Bus is provided by plugging the Serial LonTalk® Adapter (SLTA) connector into the E-Bus jack.

NOTE: If an Excel 10 W7761A Device or a Zone Manager is not connected to a good earth ground, the device internal transient protection circuitry is compromised and the function of protecting the device from noise and power line spikes cannot be fulfilled. This can result in a damaged circuit board and require replacement of the device. Refer to installation diagrams for specific wiring.

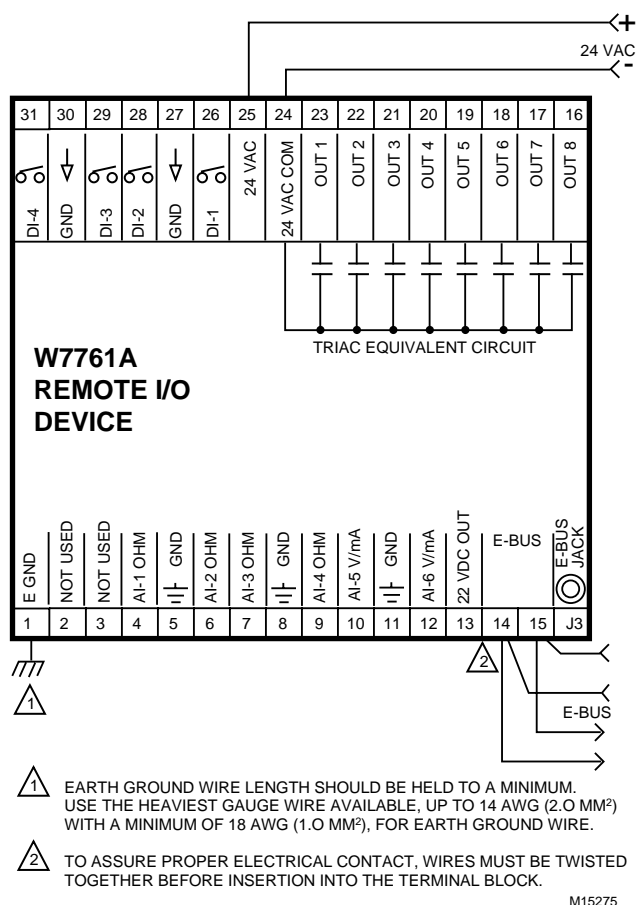


Fig. 9. W7761A device wiring diagram. (For note 2, refer to Fig. 8.)

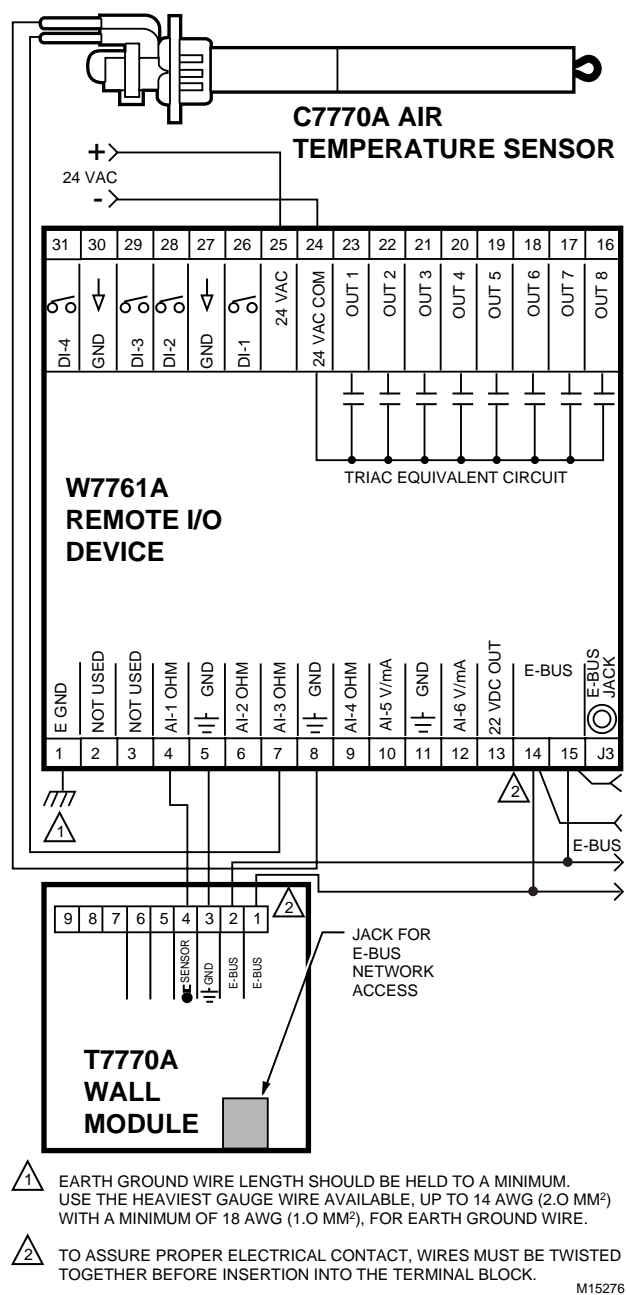


Fig. 10. Typical T7770B and C7770A wiring diagram. (For note 2, refer to Fig. 8.)

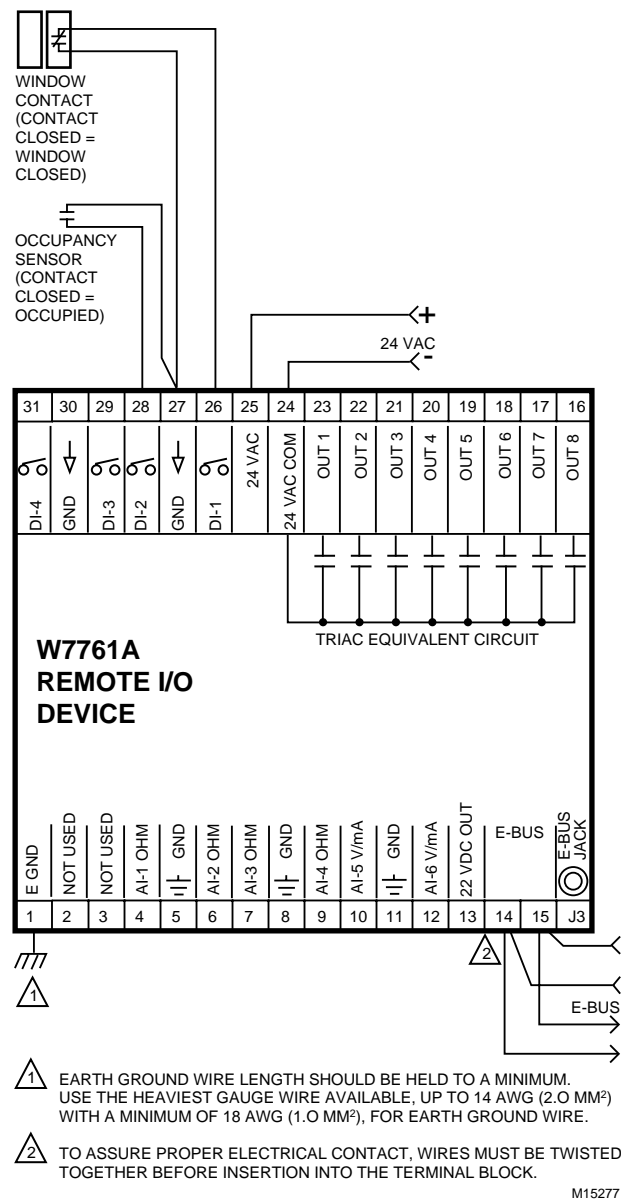


Fig. 11. Occupancy sensor wiring diagram. (For note 2, refer to Fig. 8.)

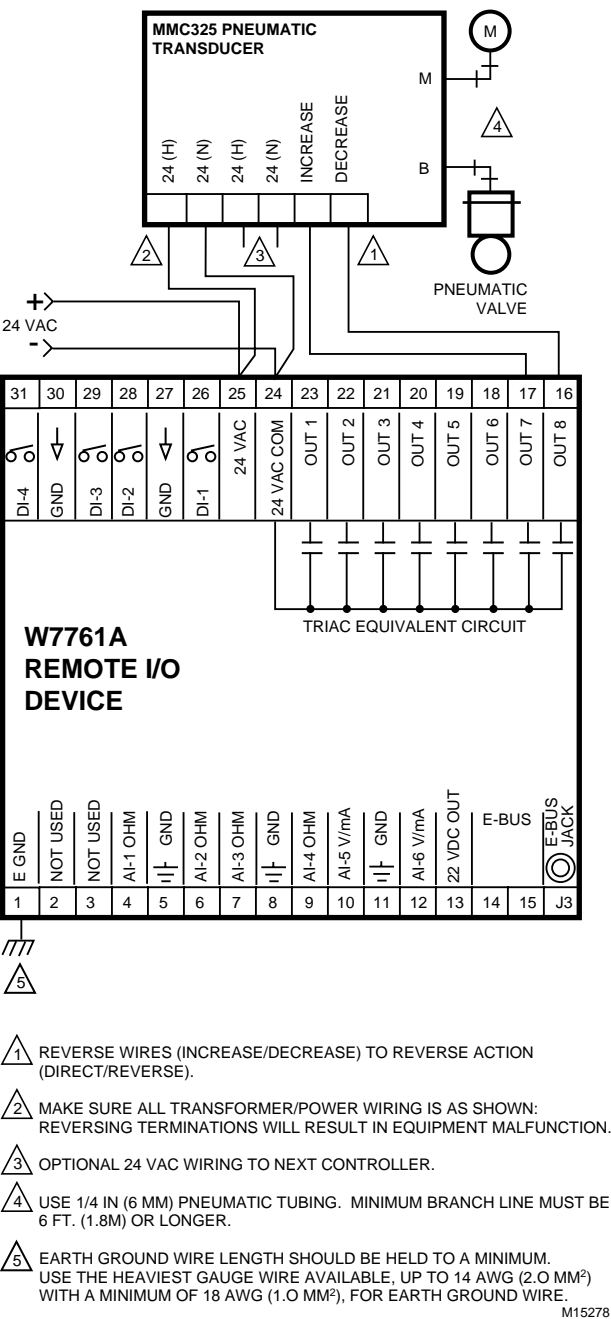


Fig. 12. Typical pneumatic transducer to W7761A.

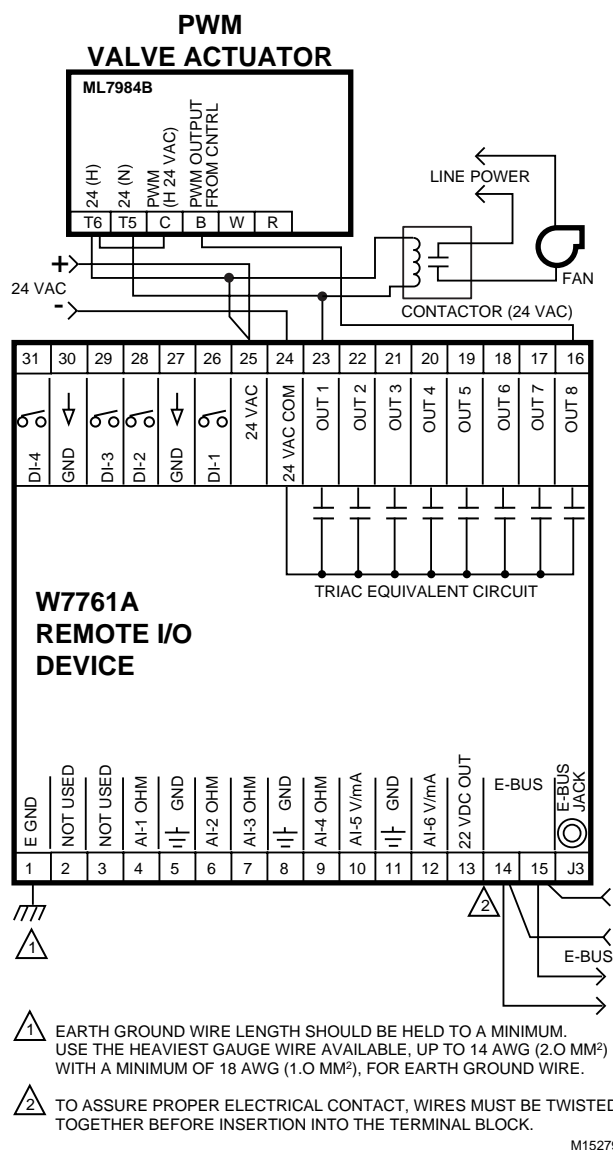


Fig. 13. Typical PWM Valve Actuator and Fan to W7761A.
(For note 2, refer to Fig. 8.)

CHECKOUT

W7761A Checkout

Step 1. Check Installation and Wiring

Inspect all wiring connections at the W7761A terminals, and verify compliance with installation wiring diagrams. If any wiring changes are required, *first* be sure to remove power from the device *before* starting work. Pay particular attention to:

- 24 Vac power connections. Verify that multiple devices powered by the same transformer are wired with the transformer secondary connected to the same input terminal numbers on each W7761A. See Fig. 5. (Device configurations are not necessarily limited to three devices, but the total power draw including accessories

cannot exceed 100 VA when powered by the same transformer (U.S. only). See System Engineering form 74-2699 for power wiring recommendations.

- Device wiring. Be sure that each device is wired (terminal 1) on the W7761A to a verified earth ground using a wire run as short as possible with the heaviest gauge wire available, up to 14 AWG (2.0 mm²) with a minimum of 18 AWG (1.0 mm²) for each device in the group. See Fig. 4.
- Verify Triac wiring to external devices uses the proper load power/24 Vac hot terminal (terminal 25 on the W7761A).

NOTE: All wiring must comply with applicable electrical codes and ordinances or as specified on installation wiring diagrams.

Verify Termination Module Placement

The installation wiring diagrams should indicate the locations for placement of 209541B Termination Module(s). Refer to the E-Bus Wiring Guidelines form, 74-2865, and the Excel 10 FTT Termination Module Installation Instructions form, 95-7554. Correct placement of the termination module(s) is required for proper E-Bus communications.

Step 2. Startup

W7761A Device Status LED

The LED on the front and center of a W7761A Device provides a visual indication of the status of the device. See Fig. 14. When the W7761A receives power, the LED should appear in one of the following allowable states:

- Off—no power to the processor.
- Continuous On—processor is in initialized state.
- Slow Blink—controlling, normal state.
- Fast Blink—when the Excel 10 has an alarm condition.

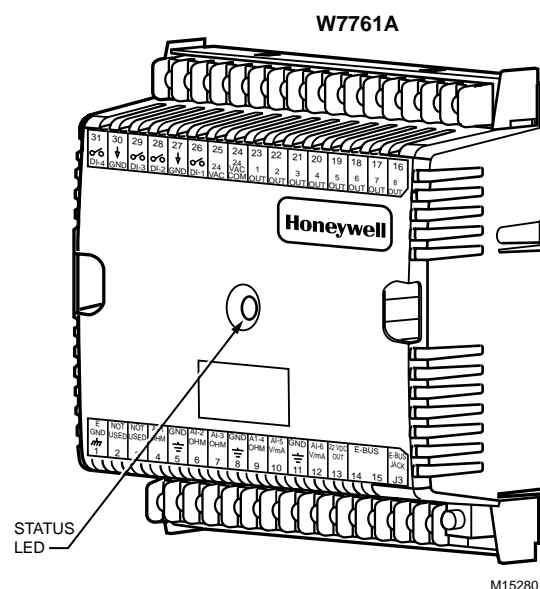


Fig. 14. LED location on W7761A.

Alarms

When an Excel 10 has an alarm condition, it reports it to the central node on the E-Bus (typically, the Excel 10 Zone Manager, or Small Building Controller). See Table 1. The information contained in an alarm message follows.

Subnet Number: This is the E-Bus subnet that contains the Excel 10 node that has the alarm condition. Subnet 1 is on the Zone Manager side of the router; Subnet 2 is on the other side.

Node Number: This is the Excel 10 node that has the alarm condition (see Network Statics).

Alarm Type: The specific alarm being issued. An Excel 10 can provide the alarm types listed in Table 1.

NOTE 1: The node can be reset by switching the node to MANUAL and then switching to the normal operating mode (using DestManMode).

Also, the Excel 10 variables, *AlarmLogX*, where X is 1 through 5, that store the last five alarms to occur in the device, are available. These points can be viewed through XBS, XI584 or E-Vision.

Broadcasting the Service Message

The Service Message allows a device on the E-Bus to be positively identified. The Service Message contains the device ID number and, therefore, can be used to confirm the physical location of a particular Excel 10 in a building.

There is one method of broadcasting the Service Message from an Excel 10 W7761A Device. This uses a hardware button on the side of the device (see Fig. 15).

When an *Assign ID* command is issued from the commissioning tool, the node goes into the SERVICE_MESSAGE mode for five minutes. In the SERVICE_MESSAGE mode, pressing the service pin on the device or the bypass button on a wall module causes the Service Message to be broadcast on the network. All other functions are normal in the SERVICE_MESSAGE mode.

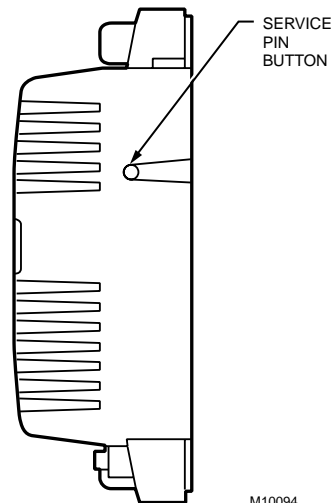


Fig. 15. Location of the Service Pin Button.

Step 3. I/O Tests

The device must be configured using the Excel 10 E-Vision PC configuration tool. Once this is done, the W7761A can be commanded to MANUAL mode, and each output can be exercised/viewed to verify proper wiring connections and equipment operation. See the Excel 10 E-Vision Users Guide form, 74-2588 for details on configuring and testing W7761A Devices.

Step 4. Verify Sequences of Operation

For the detailed descriptions of the sequences of operation, see the Excel 10 RIO System Engineering form, 74-2699 Appendix B.

Table 1. Excel 10 Alarms.

Name of alarm or error bit	Alarm type number	Meaning of alarm code or error bit
RETURN_TO_NORMAL	128	Return to no alarm after being in an alarm condition. This code is added numerically to another alarm code to indicate that the alarm condition has returned to normal.
ALARM_NOTIFY_DISABLED	255	The alarm reporting was turned off by the nviManualMode. No more alarms are reported until nviManualMode turns on alarm reporting or upon application restart.
NO_ALARM	0	No alarms presently detected.
INPUT_NV_FAILURE	1	One or more NV inputs have failed while receiving an update within their specified FAILURE_DETECT_TIME.
NODE_DISABLED	2	The control algorithm stopped because the device is in DISABLED_MODE, or FACTORY_TEST mode. The control is shut down and disabled until power is cycled or the node is reset. See NOTE 1 below.
SENSOR_FAILURE	3	One or more sensors have failed.

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