

Excel 15 W7760C Plant Controller



INSTALLATION INSTRUCTIONS

PRODUCT DESCRIPTION

The Excel 15 W7760C Plant Controller is a device that can be used to monitor and control HVAC equipment and other miscellaneous loads using LONTALK[®] communications protocol on an Echelon[®] LONWORKS[®] network. See Fig. 1.

The W7760C Plant Controller communicates via the 78 kilo bits per second (kbps) LONWORKS network, using a Free Topology Transceiver (FTT).

INSTALLATION

When mounting the W7760C, allow clearance for wiring the LONWORKS network jack, service pin pushbutton, servicing and cover removal. Avoid areas where acid fumes or other deteriorating vapors can attack the metal parts of the device or where escaping gas or other explosive vapors are present. The W7760C enclosure is constructed of a plastic base (with wiring terminal blocks) and a plastic snap-on-cover (containing electronics) with a Neuron[®] address and bar code label on the inside of the cover.

The cover is designed with a diagnostic LED in the center, a LONWORKS network jack for a network connection and a service pin pushbutton for messaging on the sides. Ventilation openings exist on all four sides for heat dissipation. The screw terminals and connecting pins are easily accessible for testing during operation. See Fig. 2 for mounting dimensions.

The W7760C subbase mounts on a DIN rail, panel or a wall. Use four screws to mount the subbase. Use a screw type (sheet metal, self-tapping or thread forming) that is appropriate for the mounting surface used. See Fig. 3 for subbase mounting dimensions.

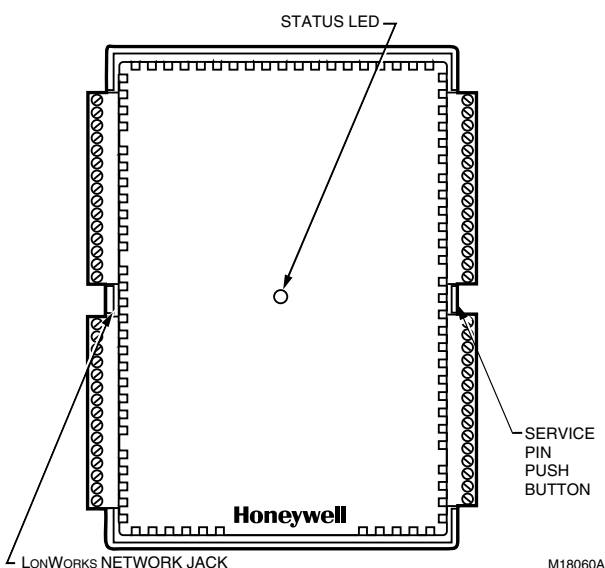


Fig. 1. Excel 15 W7760C Plant Controller.



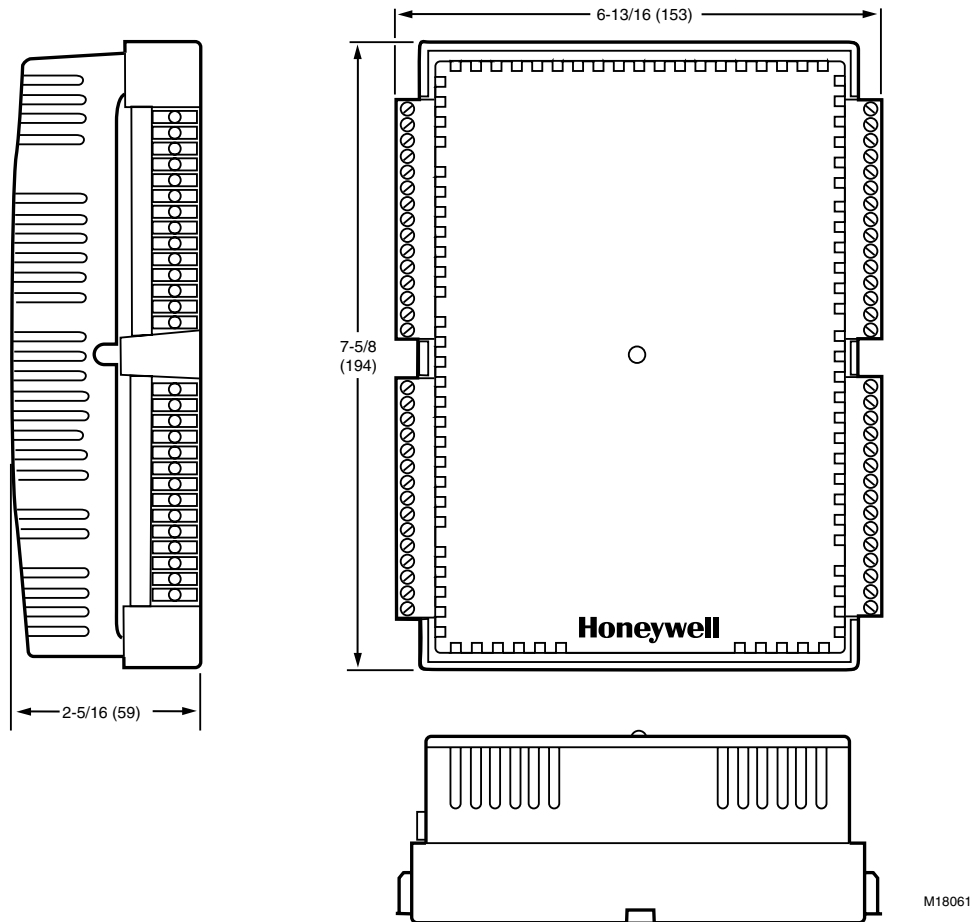


Fig. 2. W7760C assembly mounting dimensions in in. (mm).

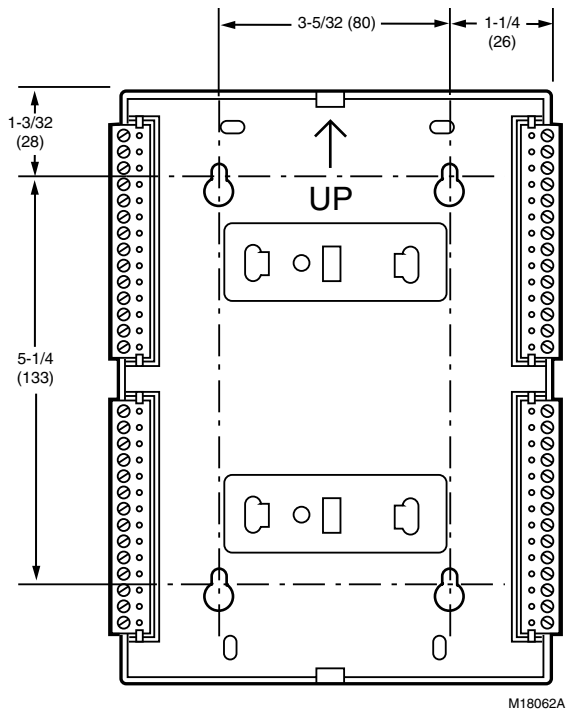


Fig. 3. W7760C subbase mounting dimensions in in. (mm).

For DIN rail installations, see Fig. 4. Obtain DIN rail from local suppliers. DIN rail standard EN 50 022, 35 x7.5 mm (1-3/8 x 5/16 in.). Also for every W7760C using DIN rail, purchase locally two each DIN rail adapters part number TKAD from Thomas and Betts.

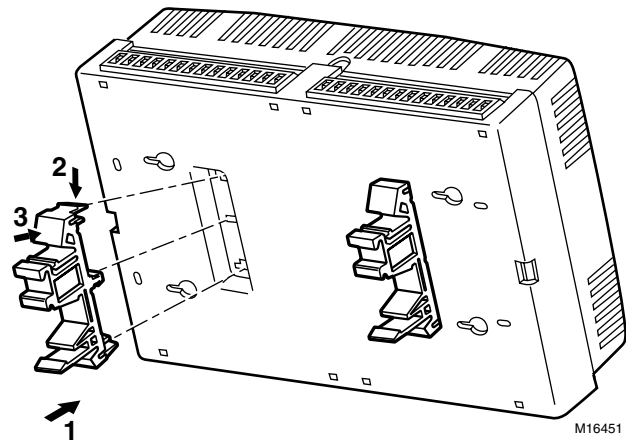


Fig. 4. Using DIN rail adapters for mounting W7760C.

See Fig. 5 for subbase wall mount.

WIRING

All wiring must comply with local applicable electrical codes and ordinances or as specified in installation wiring diagrams. The Excel 15 W7760C Plant Controller wiring is terminated at the screw terminal blocks located on the sides of the subbase. See Fig. 6 for a typical air handling unit control application.

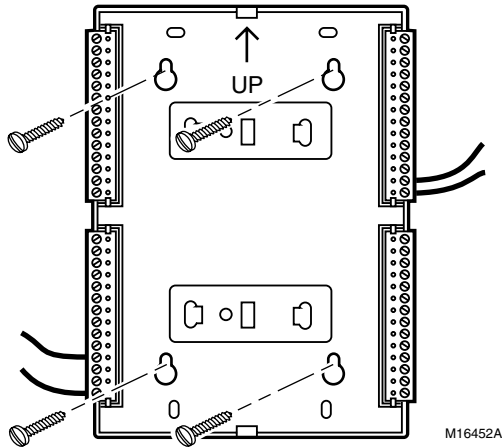


Fig. 5. W7750C subbase wall mount.

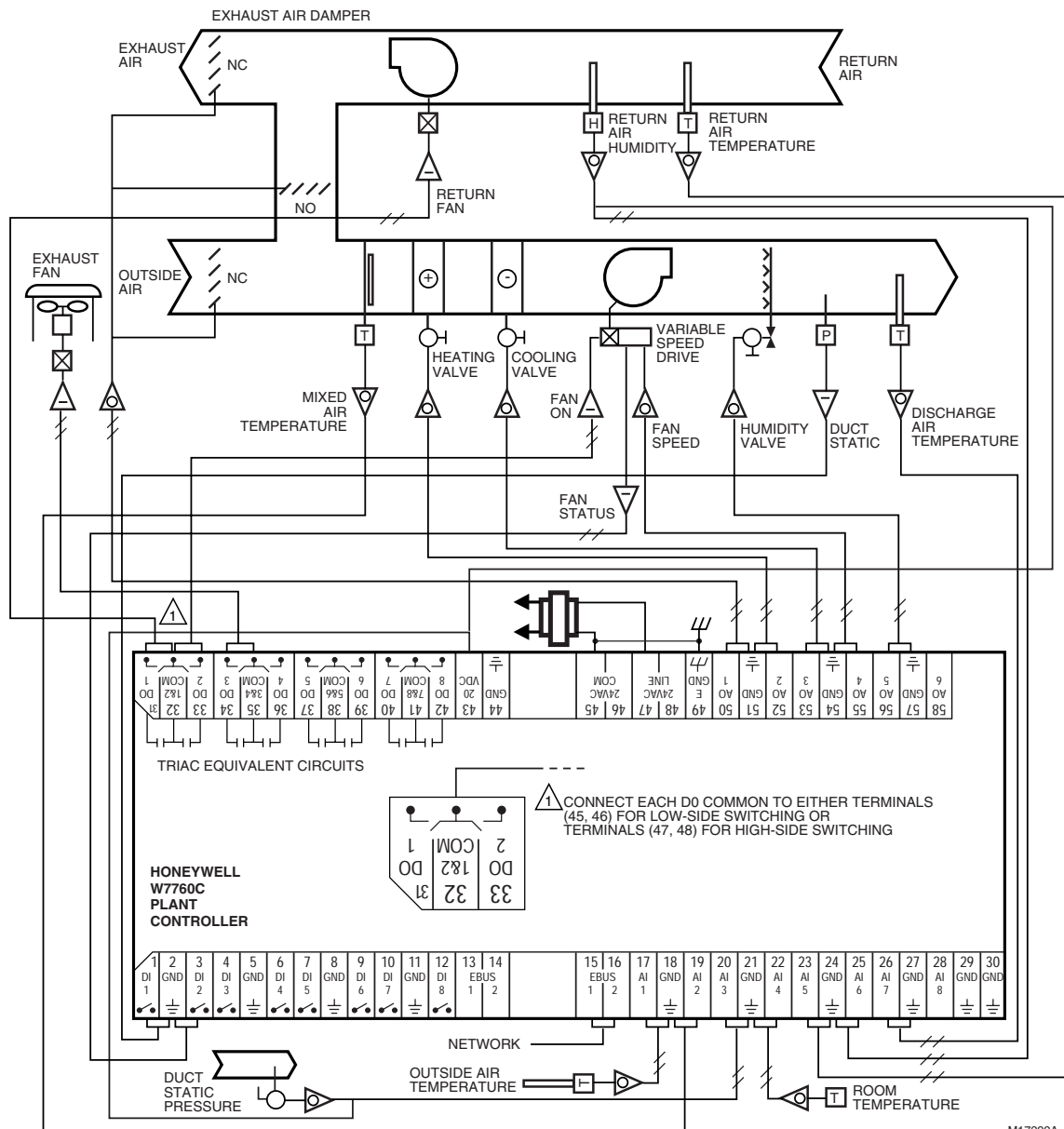


Fig. 6. Typical air handling unit control application.

NOTES on I/O wiring:

- The digital output common connections, terminals (32, 35, 38 and 41) must be connected if the corresponding digital outputs (DOs) are used. (There can be *no* mixing of low-side switching or high-side switching for each of the DO terminal pairs (31, 33), (34, 36), (37, 39) or (40, 42)). Connect the corresponding DO common to 24 Vac COM terminals (45, 46) if low-side switching is desired. Connect the corresponding DO common to 24 Vac LINE terminals (47, 48) if high-side switching is desired.
- Power all loads from an Excel 15 W7760C Plant Controller with the same transformer.
- Do *not* connect the analog or digital ground terminals (2, 5, 8, 11, 18, 21, 24, 27, 29, 30, 44, 51, 54 and 57) to earth ground. See Fig. 7.
- Use one ground for each group of two analog inputs or outputs.

Power

Provide 24 Vac power from an energy-limited Class II power source to each W7760C Plant Controller

NOTE: See W7760C Plant Controller device label for power requirements.

To conform to Class II restrictions (U.S. only), use transformers 100 VA or smaller. More than one W7760C Plant Controller can be powered with a single transformer. See Fig. 7 for power wiring details for a single controller and Fig. 8 for multiple controllers using one transformer.

NOTE: If the cover assembly/electronics is removed, power will be lost to the second controller in Fig. 8.

If an Excel 15 W7760C Plant Controller is not connected to a good earth ground, the internal transient protection circuitry is compromised and can not be protected from noise and power line spikes. This can result in a damaged circuit board and require replacing the device. For additional wiring information, see the engineering drawings at the specific job site.

IMPORTANT

Use the heaviest gauge wire available based on a maximum of 14 AWG (2.5 mm²) and a minimum of 18 AWG (1.0 mm²) for all power and earth ground wiring.

Screw type terminal blocks are designed to accept only one 14 AWG (2.5 mm²) conductor. Two or more wires of 14 AWG (2.5 mm²) can be connected with a wire nut. Include a pigtail in this wire group and attach the pigtail to the terminal block.

NOTES on power wiring:

- For multiple plant controllers operating from a single transformer, connect the same side of the transformer secondary to the same power input terminal on each controller.

- Connect the ground terminal 49 on the W7760C to a verified earth ground for each plant controller in the group. See Fig. 8. (Plant Controller configurations are not limited to two controllers, but the total power draw including accessories can not exceed 100 VA when powered by the same transformer (U.S. only). See System Engineering, form 74-3079, for power wiring recommendations.)
- Keep the earth ground connection (terminal 49) wire as short as possible. See Fig. 7.
- Unswitched 24 Vac power wiring can be in the same conduit as the LONWORKS bus cable.
- Maintain at least a three in. (76 mm) separation between Triac outputs and LONWORKS bus wiring throughout the installation.
- When daisy-chaining from one controller to another and using both sets of power terminals on the W7760C, be aware that the 24 Vac connection is broken when the cover is unplugged. If this is a problem, use one set of screw terminals for both wire pairs.

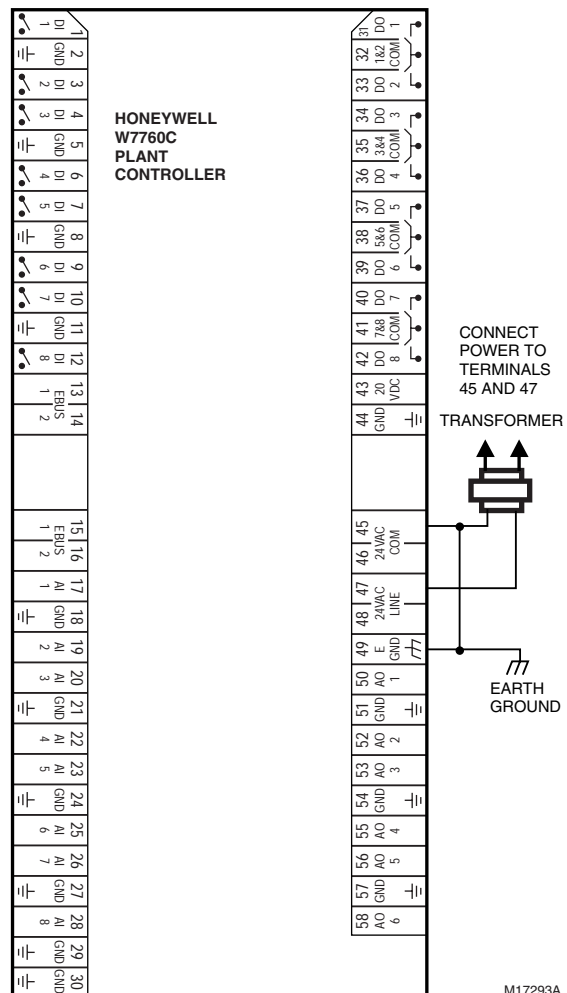


Fig. 7. Power wiring details for one W7760C per transformer

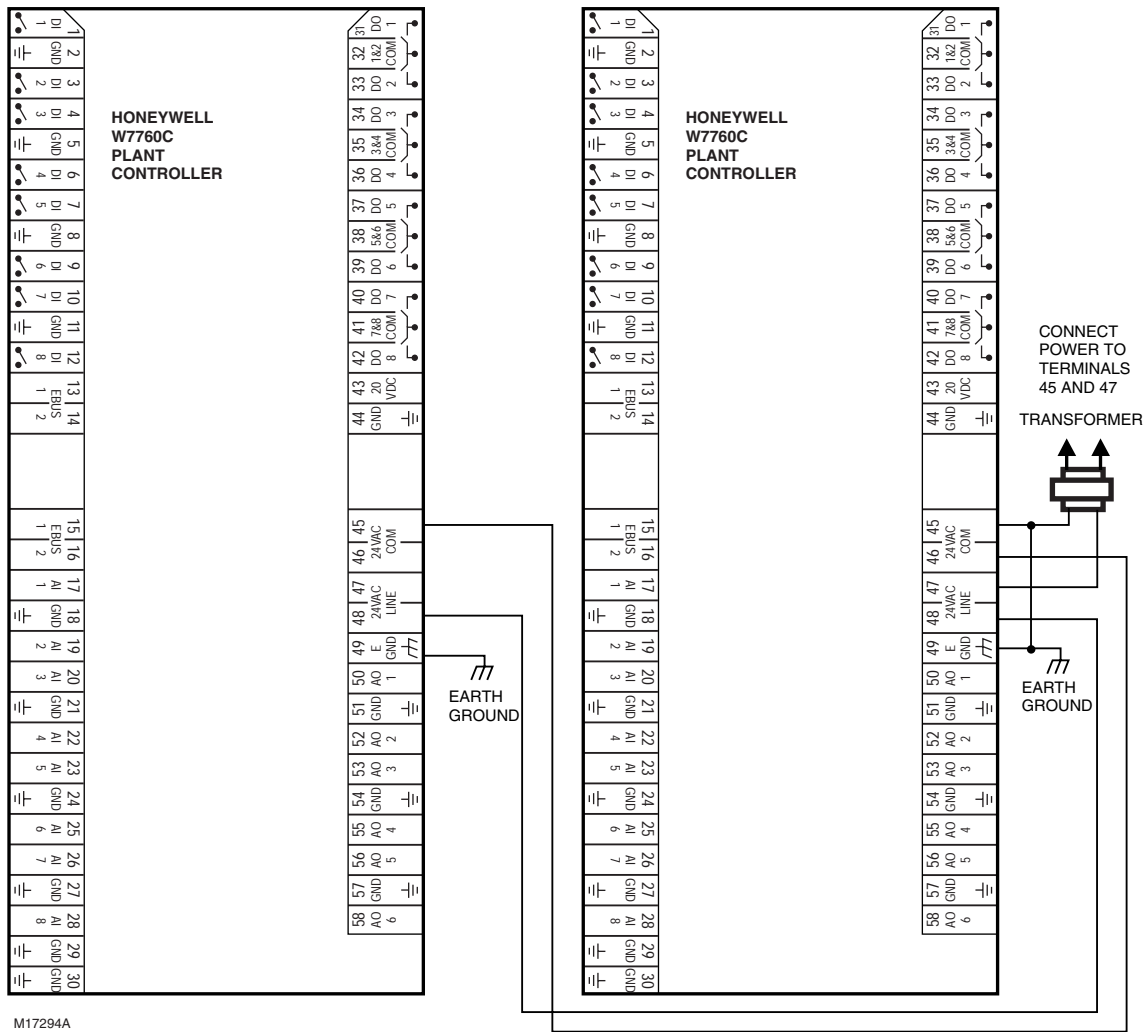


Fig. 8. Power wiring details for two W7760Cs per transformer.

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

IMPORTANT

*If the W7760C Plant Controller 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. 9. In this application, each transformer can power only one Excel 15 W7760C Plant Controller.*

Communications

Refer to the LONWORKS Bus Wiring Guidelines, form 74-2865, for a complete description of network topology rules and maximum wire length. If longer runs are required, add a Q7740A 2-way or a Q7740B 4-way repeater to extend the LONWORKS Bus length.

Approved cable types for LONWORKS Bus communications wiring is Level IV 22 AWG (0.34 mm²) plenum or nonplenum rated unshielded, twisted pair, solid conductor wire. For nonplenum areas, use Level IV 22 AWG (0.34 mm²) such as U.S. part AK3781 (one pair) or U.S. part AK3782 (two pair). In plenum areas, use plenum-rated Level IV, 22 AWG (0.34 mm²) such as U.S. part AK3791 (one pair) or U.S. part AK3792 (two pair). Contact Echelon Corp. Technical Support for the recommended vendors of Echelon approved cables. Run communications wiring in a conduit, if needed, with *non-switching* 24 Vac or sensor wiring. The Free Topology Transceiver (FTT) communications bus supports a polarity insensitive wiring scheme that supports T-tap, star, loop, and/or bus wiring.

Pull the cable to each device on the LONWORKS Bus and connect the wires to terminals 13 and 14 or 15 and 16 on the W7760C.

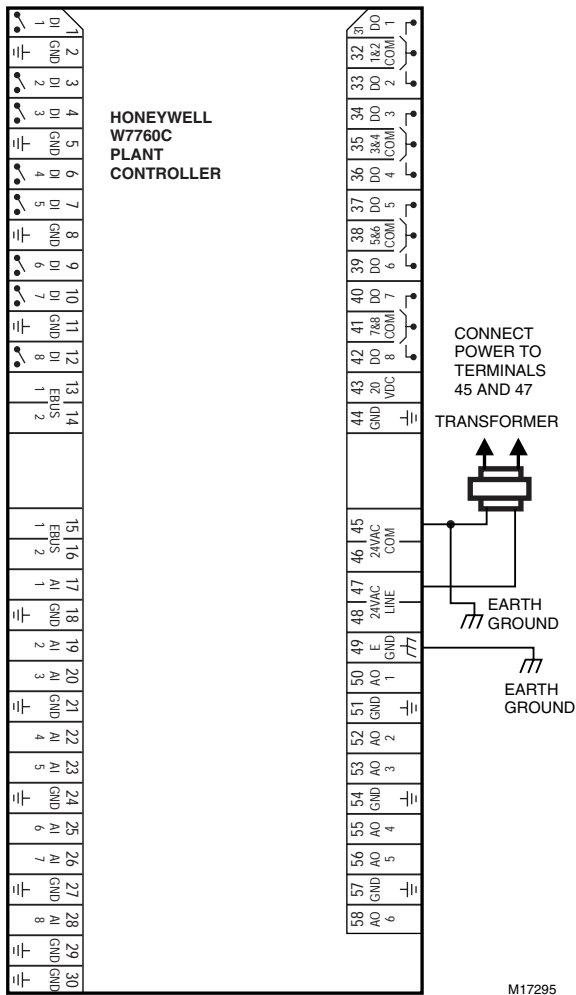


Fig. 9. Transformer power wiring details for one W7760C used in UL 1995 equipment (U.S. only).

NOTES on Communications Wiring:

- When daisy-chaining from one controller to another and using both sets of LONWORKS Bus terminals screw terminals on the W7760C, be aware that the LONWORKS Bus is broken when the cover is unplugged. If this is a problem, use one set of screw terminals for both wire pairs.
- Do not bundle output wiring with sensor, digital input or LONWORKS Bus wires.
- Do not use different wire types or gauges on the same LONWORKS Bus segment. The step change in line impedance characteristics can cause unpredictable reflections on the LONWORKS Bus.
- In noisy (high EMI) environments, avoid wire runs that are parallel to noisy power cables, motor control centers, or lines containing lighting dimmer switches; keep at least three in. (76 mm) of separation between noisy lines and the LONWORKS Bus cable.
- Each W7760C Plant Controller can support three remote input/output (RIO) devices. For more details on network topology rules, refer to the LONWORKS Bus Wiring Guidelines, form 74-2865 or see the W7760C System Engineering, form 74-3079.
- Make sure that none of the LONWORKS Bus wires are grounded.

NOTE: If a 20954B Termination Module is required at the plant controller, connect two of the three termination module wires to the LONWORKS Bus terminals. Selecting the two appropriate wires depends on the LONWORKS Bus topology. For example, when using a doubly terminated daisy-chained topology with devices on either end of a LONWORKS Bus wire run, mount the termination module on the appropriate terminals as shown in Fig. 10. Refer to the LONWORKS Bus Wiring Guidelines, form 74-2865 and the Excel 10 FTT Termination Module Installation Instructions, form 95-7554.

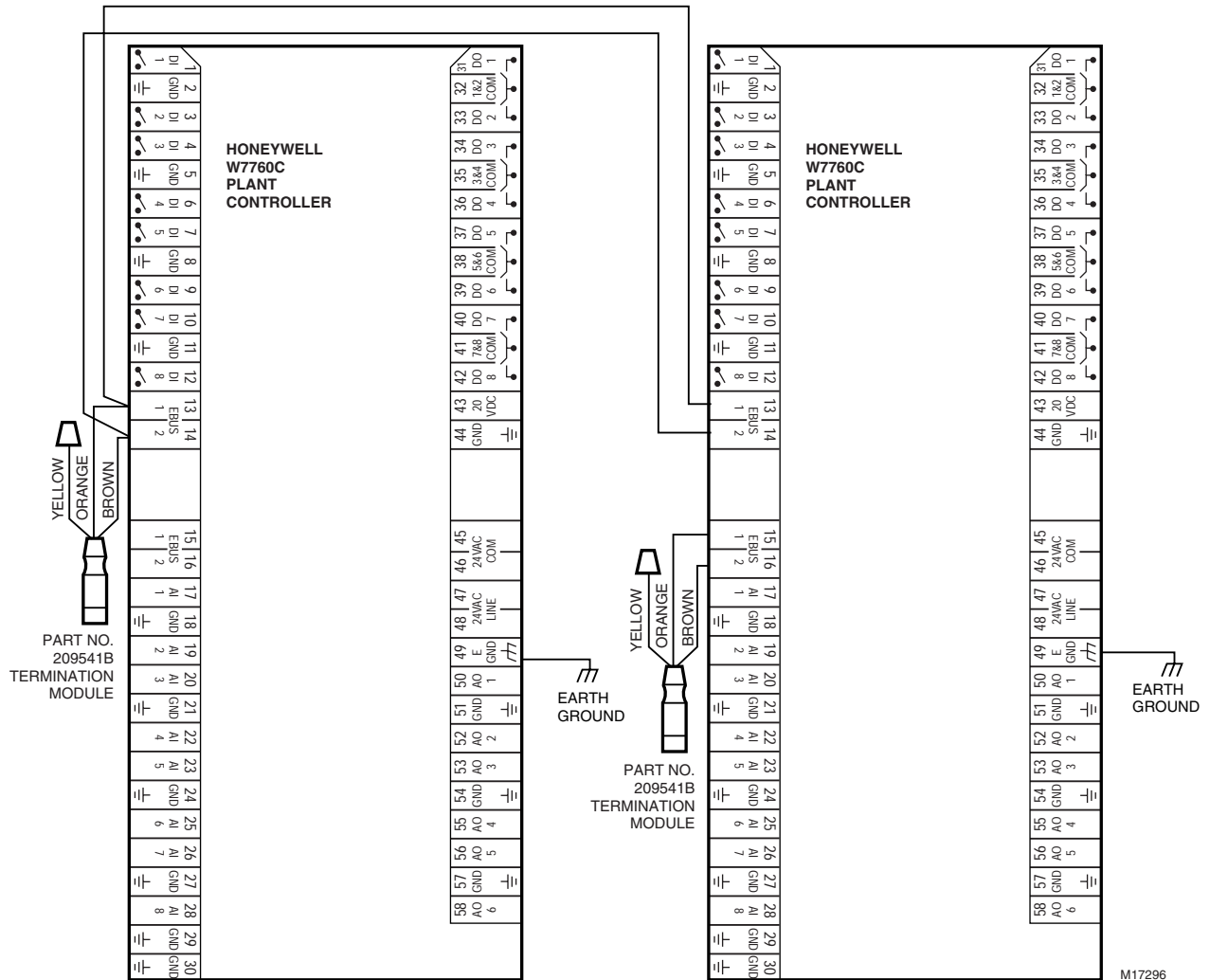


Fig. 10. Termination modules (Doubly Terminated LONWORKS Bus).

NOTE: Except when using 14 AWG (2.5 mm²) wire, be sure to twist wires together when attaching two or more wires to the same terminal. Any deviation from this guideline can result in improper electrical contact. See Fig. 11.

Wire the terminal blocks as follows:

1. Strip 1/2 in. (13 mm) insulation from the conductor.
2. If using a single wire in the required terminal location, cut the wire to 3/16 in. (5 mm) insert and tighten the screw to complete the termination.
3. If two or more wires are being inserted into one terminal location, 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.

Wiring Details

The W7760C Plant Controller has a terminal arrangement as shown in Fig. 1. Operators can access the LONWORKS Bus by plugging the Serial LONTALK Adapter (SLTA) into the LONWORKS Bus jack.

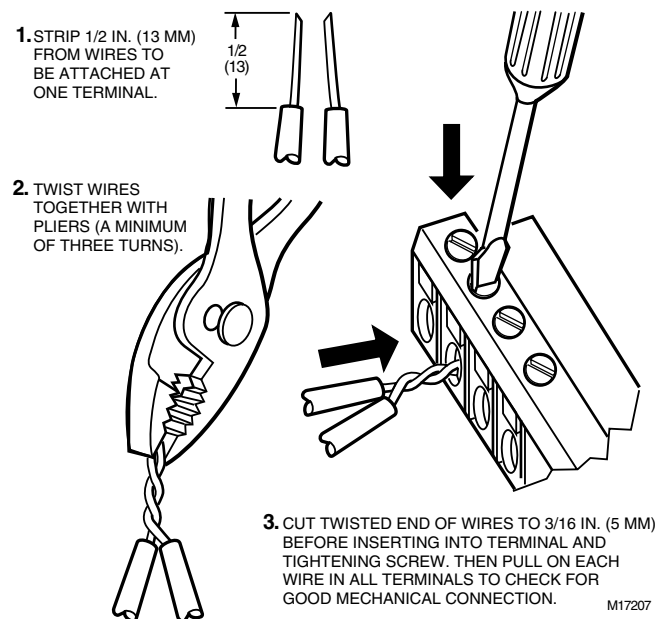


Fig. 11. Attaching two or more wires at terminal blocks.

CHECKOUT AND TEST

Step 1. Check for 24 Vac power.

1. Be sure that (terminal 49) on each W7760C Controller is wired to a verified earth ground that uses a wire run as short as possible with the heaviest gauge wire available, (based on a maximum of 14 AWG (2.5 mm²) and a minimum of 18 AWG (1.0 mm²)). See Fig. 7.
2. For 24 Vac power connections: Verify that multiple controllers powered by the same transformer are wired with the transformer secondary connected to the same input terminal numbers on each W7760C. See Fig. 8. (Plant Controller configurations are not limited to two controllers, but the total power draw, including accessories can not exceed 100 VA when powered by the same transformer (U.S. only). See System Engineering, form74-3079, for power wiring recommendations.
3. Turn on power.
4. Use a meter to check for 24 Vac power at the subbase.
5. If 24 Vac is not present, check the transformer for secure connections and proper operation.
6. If 24 Vac is present at the subbase, turn off the power.

Step 2. Check subbase wiring.

1. Inspect all wiring connections at the W7760C terminals and verify compliance with the job site drawings.
2. If any wiring changes are required, *first* be sure to remove power from the device *before* starting work.
3. Pay particular attention to Triac wiring. Hardware driven by the W7760C Triac outputs must have a minimum current draw of 25 mA and a maximum current draw or 100 mA at (terminals 31, 33, 34, 36, 37, 39, 40 and 42).

NOTE: All wiring must comply with applicable local codes and ordinances or as specified in the installation wiring diagrams.

Step 3. Verify termination module placement.

Be sure to follow the installation wiring for placement of the 20541B Termination Module(s). For a complete description of LONWORKS Bus rules, refer to the LONWORKS Bus Wiring Guidelines, form 74-2865 and the Excel 10 FTT Termination Module Installation Instructions, form 95-7554.

Step 4. Install cover assembly.

1. Make sure wiring is complete and power is off.
2. Plug the cover assembly into the subbase to activate the W7760C. See Fig. 12.

NOTE: Each input and output can be tested while the cover assembly is in place by touching a probe to the appropriate screw terminals.

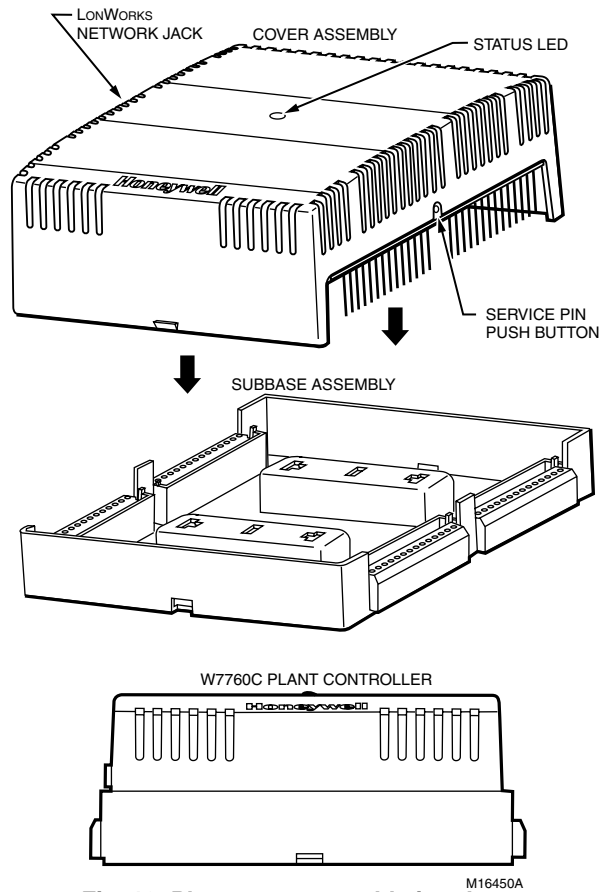


Fig. 12. Plug cover assembly into base.

Step 5. Startup

Status LED

The W7760C Plant Controller has a status LED on the front cover of the device. See Fig. 12. The LED provides a visual indication of the plant controller status. When the plant controller receives power, the LED appears in one of the following states:

1. Off - no power to the processor.
2. Continuous On - processor is in initialized state.
3. Slow Blink - controlling, normal state.
4. Fast Blink - when the W7760C has an alarm condition.

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