

AIRESPRING ETHERNET SERVICE INSTALLATION

Customer Site Preparation Requirements, Revision 1.02



Airespring strives to provide a smooth and successful installation experience. We will do all that we can to install the service on time and in a quality manner. Close coordination and effective communication between Airespring and the Customer will be critical to ensure the Ethernet service will be available when it is needed. Site readiness is essential for delivery of service, and delays in site readiness are a leading cause of installation setbacks. The important requirements detailed in this document must be addressed in a timely manner to avoid any delay of the service installation. Key to this coordination is to be certain that the Local Customer Contact (LCON) is knowledgeable and empowered regarding all below decisions.

Local Contact (LCON):

The Customer must provide a LCON, including the local contact's name, email address and phone number with whom Airespring representatives can speak with regarding scheduling, building access and problem resolution, should the need arise. An Airespring representative will contact the LCON to schedule a site visit.

The LCON must:

- Be familiar with the location where service has been requested.
- Have decision making power to address the service requirements requested.
- Have the authority to determine, or confirm, the ready date for all requirements that are the responsibility of the Customer.
- Be present on site for the site visit and be prepared to discuss and address all of the below requirements with the Airespring representative.
- For multi-tenant buildings, the LCON is responsible to negotiate establishment of optical Demarcation Point (DP) with the building property owner.
- Disclose any of the following prior to the start of the project:
 - Building access information such as parking, unloading zones, elevators and route to work area.
 - Any noise or time restrictions.
 - Any asbestos or hazardous materials present in the work area.

The Customer will ensure a safe work environment and shall ensure that all requirements have been met or will be completed by agreed upon date. The Customer will be prepared and have appropriate staff designated to test and accept service on due dates.

SITE PREPARATION DELAYS

Airespring will work to schedule with all parties to enable service completion as close to the Customer desired date as possible, HOWEVER, any changes to plans or any delays associated with site preparation can have a corresponding impact to the service delivery date. For example, if there is a two week delay in making conduit available, there will be at least a two week delay in the overall installation date for that site. The actual delay could be greater than 2 weeks depending on lead time associated with scheduling work.

The Customer must have the site ready by the committed ready date to avoid any delays in providing the requested service. If delays are anticipated, the Customer should contact Airespring as soon as they are aware of the problem, so our work forces can be re-scheduled.

WHAT TO EXPECT DURING THE SITE VISIT

In order to facilitate a successful site survey, please review the following recommendations:

- On the date of the site survey, please ensure that your LCON is on site to assist the Airespring representative. The LCON should be prepared to escort the Airespring representative through the site survey. This includes possessing entry permissions, access keys, access cards, passphrases, etc. The LCON will be responsible for noting the site requirements as the Airespring representative may not provide written documentation.
- It is advisable that the LCON note the Airespring representative's name and number in the event clarification is needed in preparing the site.
- After the site survey is completed between the LCON and the Airespring representative, it is critical that all site requirements are addressed immediately, or the order could be delayed. It is critical that the Customer advises the Airespring Project Coordinator and again with the Airespring representative during the site visit, when site completion is expected. This is needed so Airespring can advise the local loop provider with an accurate Estimated Completion Date (ECD).
- After the Customer has completed any and all needed site requirement issues identified during the site visit, they must notify Airespring the work is complete. The Airespring representative will usually revisit the site to verify the work has been satisfactorily completed or if any additional work is still required.
- The extension of conduit, raceways, and/or media beyond the minimum point of entry (MPOE) is the responsibility of the Customer. Options regarding this requirement can be discussed further with the Airespring operations team as needed.

Following is information and a list of general requirements associated with installation of fiber optic-based services. The Airespring representative will identify actual requirements for the specific installation during the site visit.

There are typically 5 basic areas of obligation to facilitate timely equipment installation and delivery of service:

PATH

The Customer is responsible for ensuring conduit is available. A clear underground or aerial path is required from the property line where local loop facilities exist, to the telephone equipment room to support the entrance fiber.

Optical Services are normally connected from the property line to the building's MPOE via an underground conduit facility. All conduits on the building's property are "subscriber conduit" and are the responsibility of the property owner to maintain and repair. Site installation work cannot begin until space within an acceptable conduit has been established between the property line and the DP.

Outside (from property line to MPOE):

- Minimum 2" conduit with a 3/8" pull rope, or mule tape, from the property line to the point of entrance. A 4" conduit is recommended, and 4" conduit – schedule 40 is required in some regions. The size of the conduit will be dependent on the future growth of the end customer. Airespring shall place inner duct/fiber liner within this section.
- Minimum 3' sweeping radius – no right angles – no more than three 90° angles without a NEMA enclosure (also known as pull box). Minimum dimensions for the NEMA enclosure space are 12" x 12" x 18".
- Paths longer than 300' or with two or more 90 degree turns will require a NEMA enclosure (12"x12"X18" minimum).

Inside (from MPOE to Optical DP):

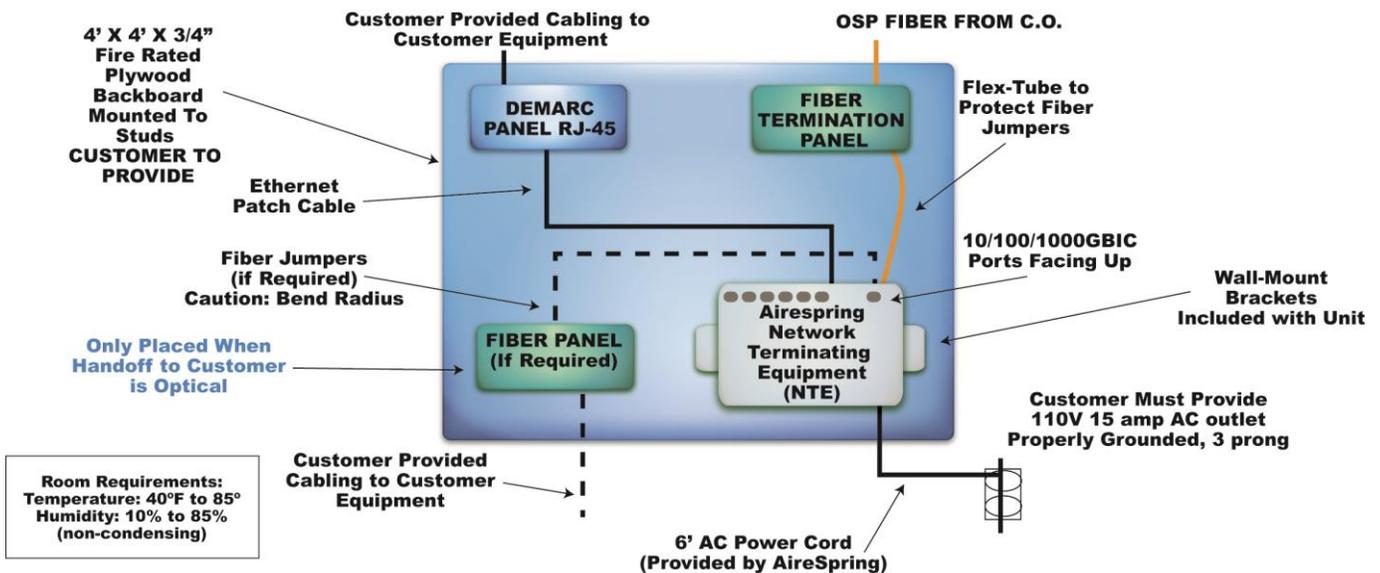
- The extension of wiring beyond the MPOE is the responsibility of the Customer. Options regarding this requirement should be discussed further with the Airespring operations team as special construction charges may apply.
- A clear path with conduit or cable tray needs to be provided from the building point of entrance to the DP where the equipment will be placed (if not at MPOE).
- If the Optical DP is not the MPOE, the customer is responsible for providing the path between the MPOE and the proposed location. The conduit shall be a minimum 2" EMT type with a hard plastic corrugated inner duct with 3/8" pull rope, or mule tape, through which the fiber will be placed.
- It is highly encouraged to share this information with any electrical contractors that work on the local loop installation project.

FLOOR SPACE AND ENVIRONMENTAL REQUIREMENTS

As a standard, fiber transport equipment, used to terminate outside plant (OSP) fiber, is placed in a common area with access to the entire building. It is the customer's responsibility to obtain the necessary permissions from the building owner for use of the common area.

Equipment racks, floor space and/or plywood backboards may be required:

- Wall mounted installation is recommended based on the small size of most network terminating equipment (NTE - see image below). If the Customer prefers the equipment to be floor rack mounted, the first preference is to use a provided rack. The rack must be of suitable strength and quality for the site earthquake risk factor and able to support the intended equipment weight and must be installed in a method that meets minimum standards for secure operation. The choice for equipment placement should be decided before the order is placed and will be subject to confirmation following a site visit by an authorized Airespring representative.



- Airespring supports the needs of the Customer to maximize their floor / rack space. In cases where requests to deploy equipment for different types of Airespring services within the same rack, the following caveats shall apply:

Rack quality / installation:

Airespring representative confirms:

- A minimum of 36" space is available in the front and rear of the rack, as per building code requirements.
- The rack is securely mounted and braced by bolting to the building floor (raised access floor panel is not building floor). The rack is secured to adjacent frames in lineup to prevent impact between frames.

- The rack meets minimum standards for quality and is sufficient to bear the expected weight of the equipment, including (if necessary) bracing shelves.
- Equipment should be placed in the lower half of the frame with heaviest equipment at the lowest location.
- If the rack is aluminum constructed, stiffening plates made up of a 12" minimum tall aluminum blank plate secured to the frame uprights should be provided to strengthen the frame; the stiffening plate should be located mid-height of the frame.
- 19" rack shall have upright opening minimum 17.80 inches to allow 19" EIA width equipment to be mounted in rack.
- Rack shall be positively connected to common ground of all network equipment in building using at minimum #6 conductor and lug to rack.
- Mounting hardware such as nut inserts for frame uprights, if required, to be provided.
- Customer must ensure a cable supporting structure that meets the National Electric Code. Standards and may be either a cable rack or a metallic EMT conduit.
- Provide a cable tray from the backboard to the top of the rack.
- Provide appropriate infrastructure that permits the rack to be wall braced.
- Provide a pathway for media and power to/from the rack.
- Transport equipment varies from vendor to vendor, but the footprint and floor space requirements are approximately the same. Higher bandwidth equipment may require more than one bay or cabinet and different power requirements. An Airespring representative will clarify if any variations are necessary once the type of equipment is determined.
- The equipment example (see image to the right) depict minimum footprint requirements for fiber transport equipment systems with the approximate bandwidth capacity from 1 DS3 up to 12 DS3s:
 - 1 foot clearance on top for fan exhaust
 - 3 feet clearance from power
 - 3 feet for front to rear access
- In addition to the space notes above, we also require a clear 3' area around the equipment for access. Specific requirements may be discussed with the Airespring representative.
- The floor must be sturdy and able to withstand from 750 lbs. (without batteries) to 1,100 lbs. (with batteries) per bay of equipment.
- Operating environment should be between +40° F and 100° F at 20% to 50% relative humidity.



- Equipment location(s) for multiplexers and other electronic equipment must be clean, environmentally conditioned, with proper lighting.
- With cabinet installations, if the floor is a raised computer floor, there must be no obstructions below the floor tiles and a small section of tile must be cut to allow for cable entry.
- Other regional specifications must be met as dictated by OSHA and local regulatory agencies (e. g. Earthquake Bracing).
- Individual consideration will be given to the particular circumstances of space limitations. If, during the site visit, adequate common space is not available, the Airespring representative will discuss alternative arrangements to see if the LCON can provide additional space in a common area. If no alternate common area is available, the issue will be referred to an Airespring Ethernet specialist representative.
- When equipment is to be placed in the center of a terminal room, overhead ladder racking or under floor cable tray from the wall to the fiber equipment must be provided.
- Wall boards must be A 4' x 8' x 3/4" Fire rated Plywood and be fastened to studs. In some instances a provided bay can be used in lieu of the wall backboard. This alternate arrangement must be discussed with the Airespring representative at the site visit.
- **New construction only:** If the equipment is being placed during a period of new or scheduled construction, the Airespring representative will determine if the location is suitable during the initial site inspection. Following completion of construction and prior to placement of the NTE, a final inspection will be required to confirm site readiness. Also note, prior to the installation of any Airespring equipment, the room **must** be secured, including locks on doors.

POWER

It is required that the Customer ensures permanent dedicated power for the equipment being installed. Power requirements can consist of nominal –48VDC, 110V, 125V, 220V, etc. located within 6 feet of the Airespring equipment. Airespring may require more than one power outlet for some equipment types, and there are specific amperage requirements for different equipment types. These items need to be discussed with the Airespring representative to ensure that service can be provisioned on time.

Equipment / Power Compatibility:

Airespring representative confirms:

- Power supply for each device is adequate.
- If the NTE is AC powered, the cord must be physically separated from all signal cabling in the relay rack.

GROUND

Relay racks/cabinets must be grounded by placing an exposed #6 or larger grounding wire to the building's ground source. This ground wire will be attached to the closest ground rod (earth ground) or building bus bar available and run to the NTE location in the room. In addition, the 110V, 15 amps AC outlet must be 3 prong and properly grounded as well.

If the site will be using a stand-alone, centralized bulk power plant (now or at any time in the future), then grounding is required as follows: #2 stranded ground is required from the earth electrode system to the equipment room. This would be connected to a grounding bus bar, or otherwise directly connected to different components. A #6 stranded ground is required from the grounding bus bar to the NTE.

If the site will not be using a stand-alone, centralized bulk power plant (now or at any time in the future), and instead will be using an embedded or integrated power configuration where the power plant is located within the same rack or cabinet as the equipment it powers, then grounding is required as follows:

- A #6 stranded ground is required from the earth electrode system to the equipment room. This would be connected to a grounding bus bar, or otherwise directly connected to different components.
- A #6 stranded ground is required from the grounding bus bar to the network equipment.

Specific requirements may be discussed with the Airespring representative at the time of the site visit.