

Cisco Ultra-Reliable Wireless Backhaul FM SECTOR

Installation and Configuration Manual

(Formerly Fluidmesh)
Edition 1.0 (For FM-SECTOR-90 antennas)

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1. HAZARDOUS CONDITION WARNINGS

Like all other global technology vendors, Fluidmesh is required to comply with all local health and government regulations in the locations in which we operate. This includes meeting radio frequency (RF) exposure limits for our products.

Our equipment is tested in accordance with regulatory requirements as a condition to our ability to market and sell in any given jurisdiction. As an equipment manufacturer, Fluidmesh defers to expert national and international health organizations responsible for guidance on the safety of RF signals, specifically the US Food and Drug Administration (FDA), Health Canada, the World Health Organization (WHO), and other national and global health agencies.

In May 2019, the FDA stated that there is "no link between adverse health effects and exposure at or under the current RF energy exposure limit", and that the current FCC RF exposure limits are sufficient to insure the safety of users.

If any Fluidmesh hardware unit breaks down or malfunctions, emits smoke or an unusual smell, if water or other foreign matter enters the unit enclosure, or if the unit is dropped onto a hard surface or damaged in any way, power off the unit immediately and contact an authorized Fluidmesh Networks dealer for assistance.

If you are adjusting and/or controlling a Fluidmesh device using control software such as the RACER™ interface or the device's local Configurator interface, do not make configuration changes unless you know with certainty that your changes will not negatively impact people or animals in the vicinity of the device and its antennas.

1.1. Radio-frequency transmission hazard



WARNING

The system shown in this manual is designed to be installed and operated in a way that avoids contact with the antennas by human beings. The legislation quoted in this section is designed to reduce overall exposure of human beings to RF radiation.

This section gives minimum separation distances between antennas and humans. It is strongly recommended that the system be installed in a location where these minimum separation distances can be maintained at all times.

United States: This system has been evaluated for RF exposure for humans, in accordance with FCC regulation CFR 47 Part 2.1091. To maintain compliance, the minimum separation distance from the antenna to general bystanders is 20cm/7.9in. (all FM Ponte kit and x200 radio transceivers), or 21cm/8.3 in. (all FM1300 Otto and x500 radio transceivers).

Canada: This system has been evaluated for RF exposure for humans, in accordance with ISED regulation RSS-102. To maintain compliance, the minimum separation distance from the antenna to general bystanders is 20cm/7.9in. for all Fluidmesh radio transceivers.

Europe / Australia / New Zealand: This system has been evaluated for RF exposure for humans, in accordance with standard EN 62232. To maintain compliance, the minimum separation distance from the antenna to general bystanders is 20cm/7.9in. for all Fluidmesh radio transceivers.

Before activating any device capable of transmitting RF signals, make sure that all persons and animals are protected from possible RF exposure.

Make sure that all RF feeds are securely connected to an appropriate antenna. Never activate any RF-capable device that is not connected to an antenna.

2. Reporting mistakes and recommending improvements

You can help improve this manual.

If you find any mistakes, or if you know of a way to improve the procedures that are given, please let us know by E-mailing your suggestions to documentation@fluidmesh.com.

3. Introduction

This manual gives field-level installation instructions for installing Fluidmesh antennas. It is intended for use by wireless networking professionals who have been tasked with installing Fluidmesh radio antennas.

To prevent personal injury and equipment damage, and to ensure optimum network performance:

- Install all network hardware where it cannot be physically damaged.
- Shield all network hardware from salt water and chemical spray.
- Keep a safe distance from all RF-radiating devices when such devices are powered on, make sure that all persons and animals are protected from possible RF exposure before activating any device capable of transmitting RF signals, and do not stand in line with powered RF-radiating devices.
- Make sure that all RF feeds are securely connected to an appropriate antenna before activating any device capable of transmitting RF signals.

3.1. The SECTOR 90 antenna

The SECTOR 90 antenna is a sector-type antenna for mobile applications.

This antenna includes a mounting bracket with 10 degrees of adjustable downtilt. The mounting bracket allows it to be mounted on antenna masts with outside diameters of between 1.5" (38mm) and 3.0" (76mm).

4. Installation

4.1. Environmental rating

Fluidmesh SECTOR 90 antennas are designed to withstand adverse environmental conditions.

4.2. General installation practices to follow and avoid

When installing and adjusting an antenna in any scenario that uses Fluidmesh hardware, install and adjust the antenna according to the following recommendations.



NOTE

Not all recommendations listed in this section will apply to all antennas.

- Make sure the antenna and its transceiver unit are properly grounded (earthed) to prevent the antenna and transceiver from accumulating static electricity or producing sparks. If the antenna and/or transceiver are mounted in a flammable environment, stray sparks could ignite the flammable materials, causing an explosion and/or flash fire.
- Wherever practically possible, keep all antenna cabling runs under 10 feet (three metres). Radio signals conducted through antenna cabling before being transmitted from an antenna suffer from a phenomenon called signal attenuation. The signal gradually dissipates along the length of the cable due to electrical resistance before being transmitted from the antenna, reducing signal amplitude.
- Do not bend or kink antenna cabling. Kinks and bends may cause breaks and/or narrow points in the cable's electrical conductor, resulting in degraded signal amplitude.
- Be sure to comply with the minimum and maximum co-location distances specified by Fluidmesh for each antenna type. This helps avoid co-location interference (in which the radio transmissions from two or more antennas partially cancel each other out).
 - If more than one SECTOR 90 antenna is used as part of the same access point (AP), individual SECTOR 90 antennas should be physically located at least one meter (3 feet) apart. Ideally, individual SECTOR 90 antennas must be located as far away from each other as practically possible.
- Note that during test and adjustment of stationary antennas, an antenna placement adjustment of between four and five feet (1.2m to 1.5m) may be needed.

- A signal quality test and adjustment must always be done during an installation to verify signal quality and amplitude. If the test and adjustment procedure is not done, the installation is at risk of underperforming due to poor line-of-sight and other factors.
- If applicable, avoid installing antennas inside audio loudspeaker enclosures. The proximity of a radio antenna to the metal in speaker bodies causes degraded performance due to radio reflections. In addition, the energy of radio (microwave) transmissions that strike metal is partially or completely dissipated as a flow of electrons, requiring higher transmission power to broadcast a viable signal. Non-metallic loudspeaker enclosures made of polycarbonate or other plastics, enclosures painted with non-metallic paint, and antennas mounted under or behind shrouds are all acceptable.
- Avoid installing antennas on or close to metal surfaces, metal beams and similar. This helps to avoid radio reflections and dissipation.

4.3. Contents of the kit

The antenna kit contains the following components:

4.3.1. FM-SECTOR-90

- 1x FM-SECTOR 90 antenna, with upper and lower main mounting brackets pre-installed.
- 2x crescent brackets (with pipe mounts).
- 2x crescent brackets (plain).
- 4x 3/8-16x7" carriage bolts.
- 4x 3/8" washers.
- 4x 3/8-16 hex-head nuts.

4.4. Installing the antenna



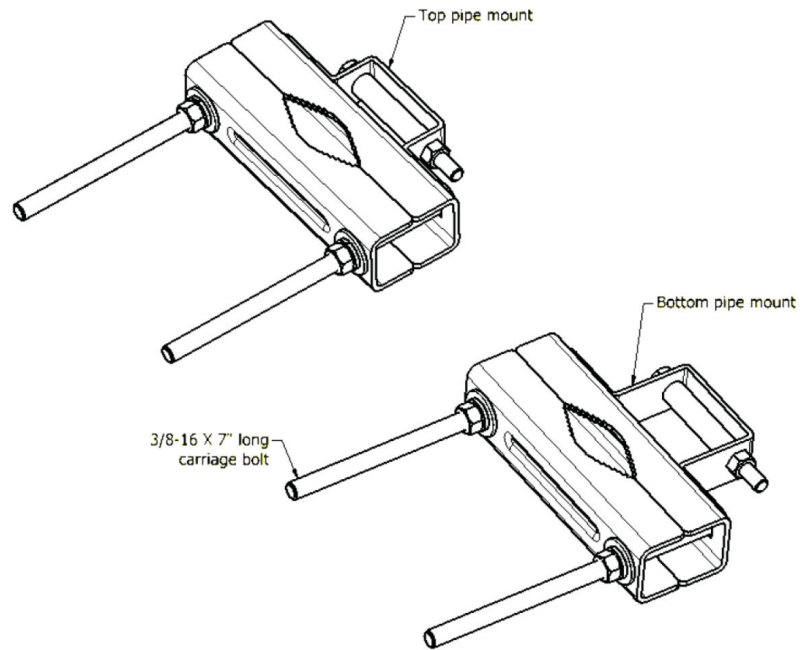
IMPORTANT

When connecting an antenna to a radio unit, only use shielded co-axial antenna cables of type LMR 240 or better.

4.4.1. Installing a SECTOR 90 antenna

To install a SECTOR 90 antenna on a vertically-oriented utility pole, do the following steps:

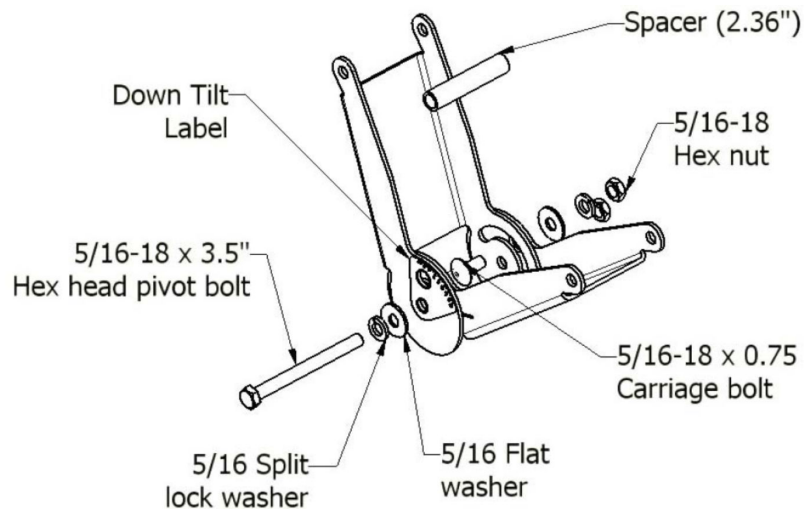
1. Assemble the top and bottom pipe mounts as seen below.



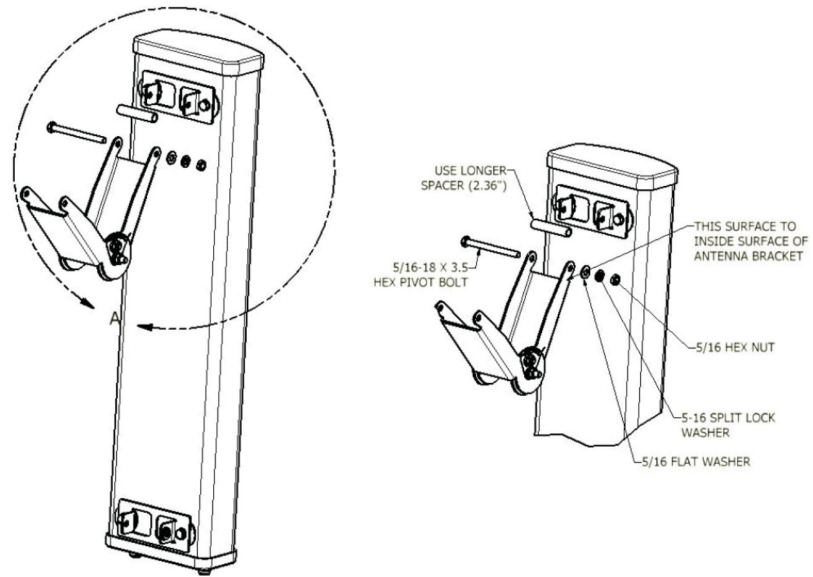
IMPORTANT

Note that the top pipe mount bracket has a shorter swivel extension than the bottom pipe mount.

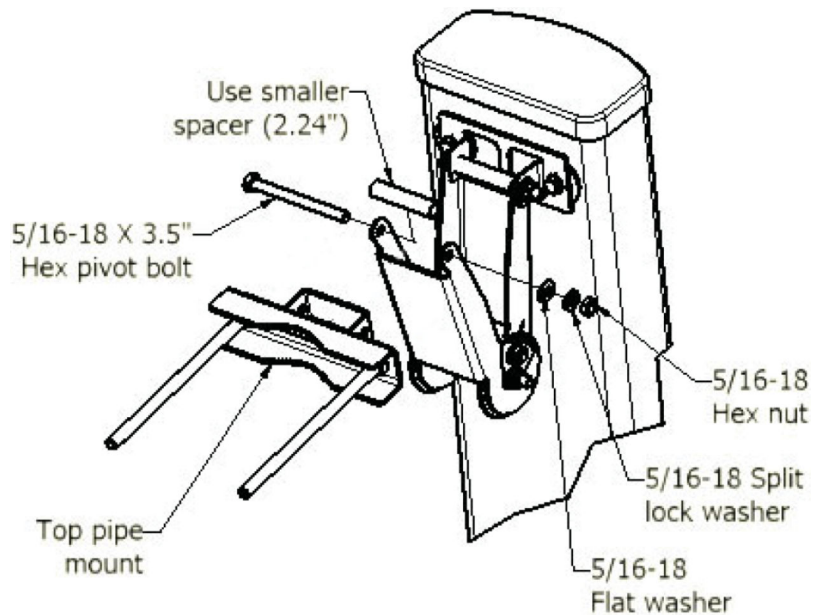
2. Assemble the downtilt bracket as seen below.



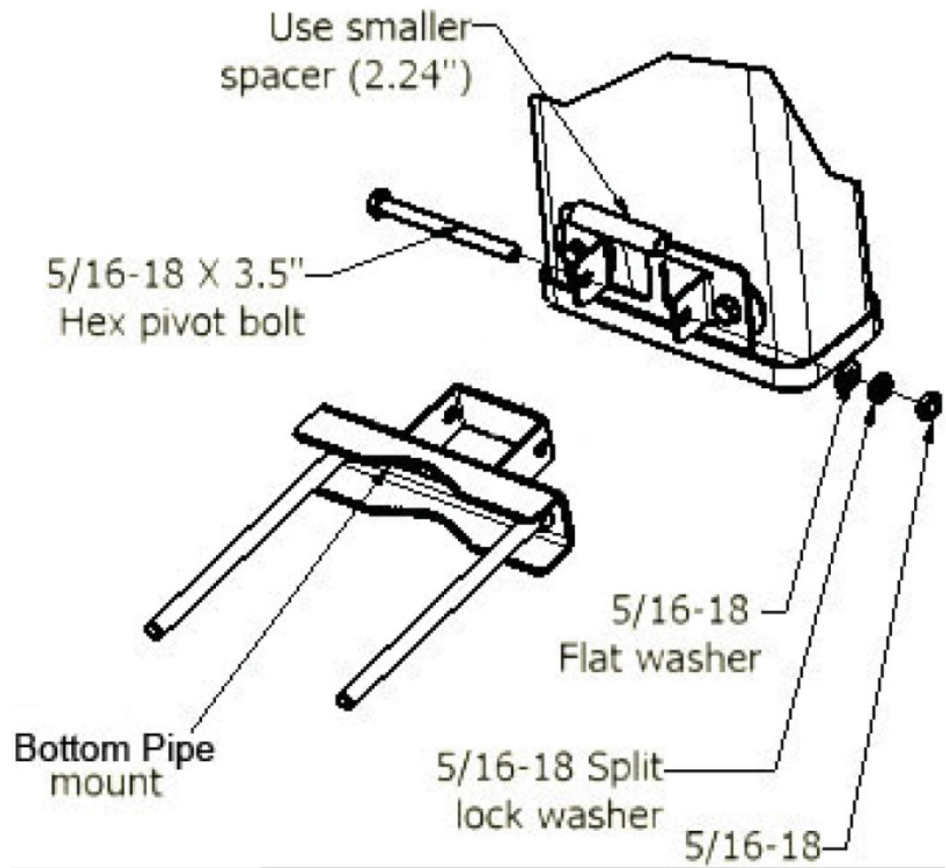
3. Make sure the antenna body is oriented the correct way up. The Type N female connectors must face *down*.
4. Attach the downtilt bracket to the top antenna bracket as seen below.



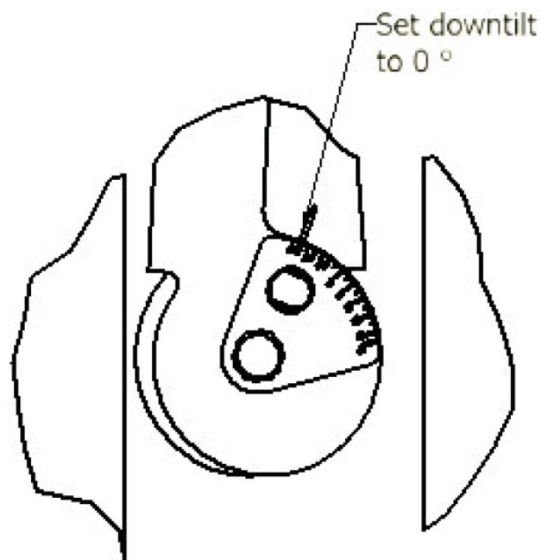
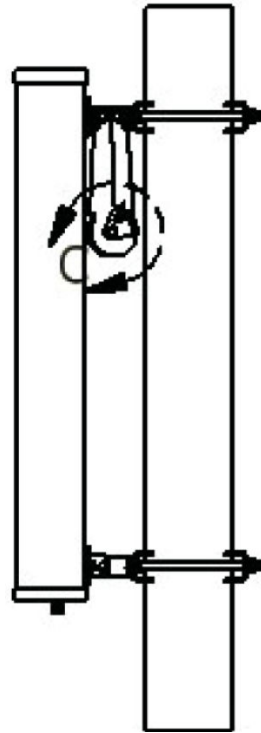
5. Assemble the top pipe mount to the downtilt bracket as seen below.



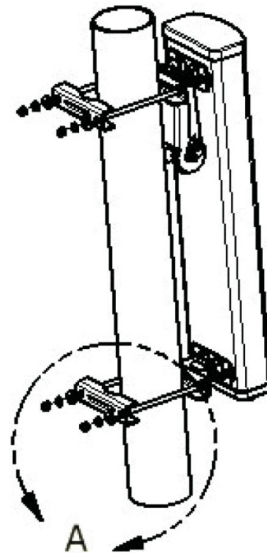
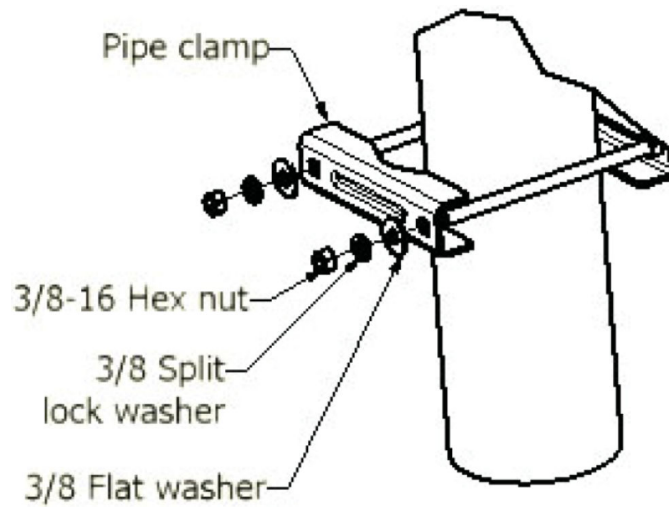
6. Assemble the bottom pipe mount to the bottom antenna bracket as seen below.



7. Adjust the downtilt bracket to 0 degrees of tilt as seen below. Temporarily tighten the downtilt adjustment nut and bolt.



8. Attach the antenna assembly to the antenna mast using the top and bottom pipe mounts, as seen below.



9. Use an appropriate torque wrench to tighten the fasteners to the following specifications:
 - Tighten all 3/8-16 fasteners to 9 ft-lbs (12.2 N•M).
 - Tighten all 5/16-18 fasteners to 10 ft-lbs (13.5 N•M).

5. Specifications

The table below contains the general specifications for the antenna.

5.1. SECTOR 90 antenna specifications

Table 1. SECTOR-90 specifications

	Dimensions (in millimetres)	Mass	Working frequency range	Gain	Polarization
FM- SECTOR-90- DS	711 x 171 x 90	3.1 Kg (7 lbs)	4900 MHz to 5400 MHz	16 dBi	+/-45° linear dual slant

6. Notices and copyright



WARNING

Installation of Fluidmesh hardware devices and their supporting infrastructure must be done by suitably qualified personnel only. In some countries, installation by a certified electrician may be required.

Fluidmesh hardware installations must comply with all applicable local legislation.



WARNING

Never disassemble a Fluidmesh hardware device to any extent that is not described in the relevant device user's manual. Fluidmesh devices contain no user-serviceable parts. Disassembling a Fluidmesh hardware device will invalidate the device warranty, and may compromise the operational integrity of the device.

On some Fluidmesh radio transceiver devices, the lower access cover must be removed to gain access to the hardware *Reset* button. Do not operate a radio transceiver device for extended periods if its lower access cover has been removed.



WARNING

To avoid danger from non-ionizing radiation and/or electric shock and/or high-intensity laser or LED light sources, be sure to install the unit only in a location with restricted access.



WARNING

To avoid danger from electric shock, do not expose the unit to water or high humidity if the unit is powered ON, or if any access covers have been removed from the unit enclosure.

Do not place liquid-filled objects on or above the unit.

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