

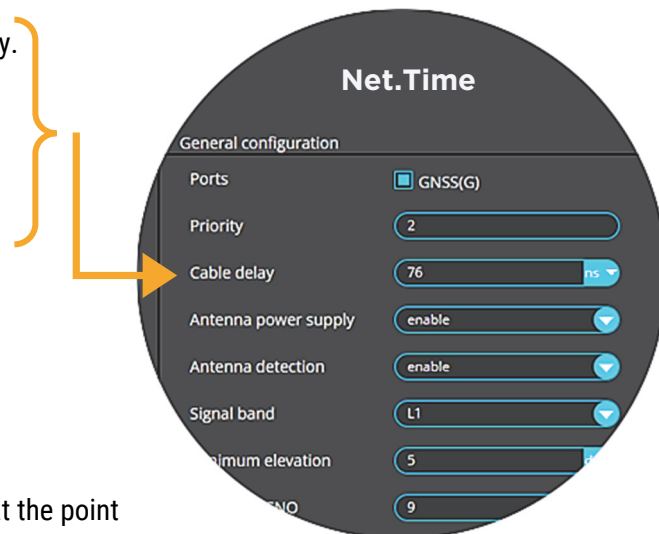
1. Antenna Placement Guidelines

To maximize GNSS signal quality and ensure long-term synchronization performance:

- **Sky Visibility:** Place the antenna with the widest possible clear view of the sky, ideally 360° horizontal and >80° vertical angle coverage. Avoid placement near walls, AC units, or structures causing shadowing or multipath.
- **Avoid Multipath:** Stay clear of reflective surfaces (e.g., glass, metal) to reduce signal distortion due to multipath propagation.
- **Elevation and Mounting:** Mount the antenna on a grounded steel pipe with a ¾" male thread, firmly fixed using roof clamps.

2. Coaxial Cabling and Amplification

- **Cable Type:** Use *LMR400* low-loss coaxial cable (Ø 10.5 mm). It ensures signal integrity over long distances.
- **Distance Limits:**
 - Without amplifier: up to **50 m**.
 - With 35 dB inline amplifier: up to **200 m** (two 100 m segments with in-line amp).
- **Delay Compensation:**
 - Each meter of LMR400 introduces ~3.9 ns delay.
 - Amplifier (18 ns)
 - Suppressor (11 ns)
 - Patch cable (12 ns) for total delay budget.



3. Surge/Lightning Protection – Critical Placement

Protection Placement & Grounding

- **Where to Install:** Mount the surge suppressor *indoors*, at the point where the LMR400 cable enters the equipment room.
- **Grounding:**
 - Use AWG11 (4 mm²) or thicker ground wire.
 - Keep the ground wire **as short and straight as possible** (preferably vertical), bonded to the **building's electrical grounding system**.

4. Additional Best Practices

- **Avoid EMT Conduits for Grounding:** Do *not* run ground wires through metallic conduits unless bonded at both ends. Inductance increases with poor bonding, limiting surge dissipation.
- **Single Ground Point:** Especially in rooftop setups, ensure **all equipment grounds are bonded to a single point** to avoid ground loops during lightning strikes.

5. Installation Diagrams

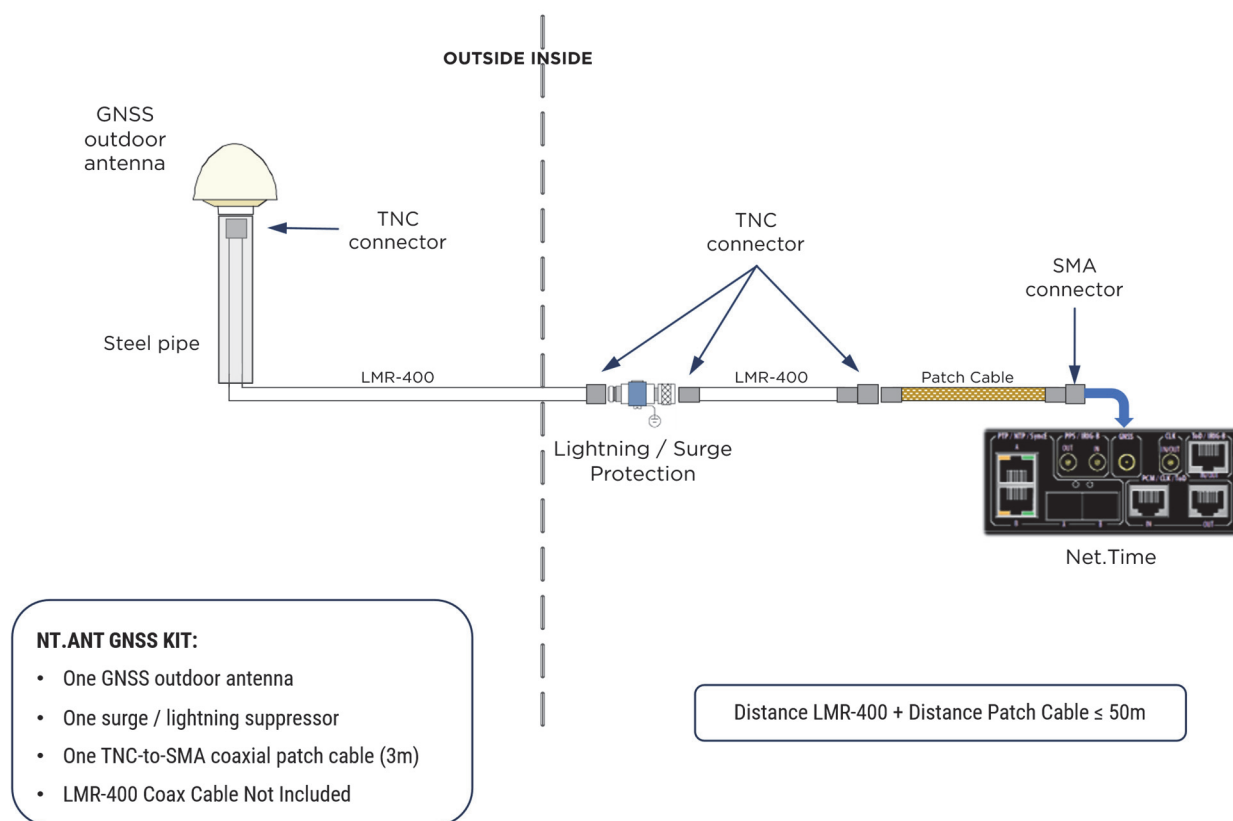


Figure 1 – NT.ANT - Fixed outdoor typical GNSS antenna installation

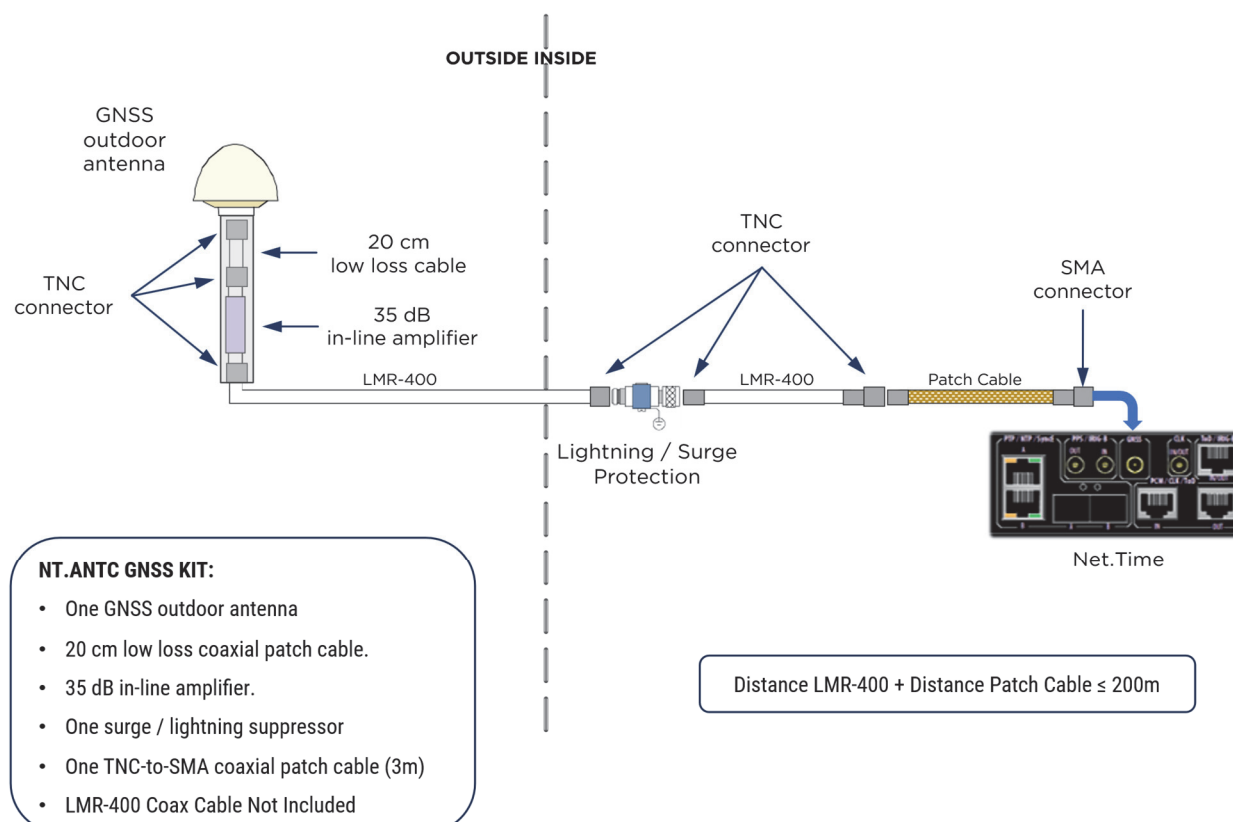


Figure 2 – NT.ANTC - Fixed outdoor typical GNSS antenna installation with the 35 dB in-line amplifier