

Stationary Pickup Coil Selection Guide for Accumetrics Telemetry

This guide is intended to provide users with information about the range of pickup coil variations employed for Accumetrics' rotor telemetry systems. These options serve the requirements for virtually all applications. When special requirements demand custom pickup designs, Accumetrics will design a solution suited to the application.

Flexible Loop coil (for AT-5000 and AT-7500 battery powered telemetry):



This is a highly effective flexible wire loop coil intended for battery powered telemetry (AT-5000 and AT-7500). It is mounted by encircling a shaft, with a radial distance to the transmitter of 10 inches or less. The loop section is effectively a BNC connected wire attaching the shield of the coax, via a loop around the shaft, to the coax center conductor, providing ease of connection.

Alternatively, the loop may be shaped in a "C" shape, thereby not having an loop length below a horizontal mounted (automotive or similar) shaft (Note: this causes a field cancellation at the axial mid-point between the parallel cables--care should be taken to position the transmitter axially to the side-- away from this null spot.)

Although a specific loop diameter is specified when ordering, a larger loop can be used on smaller diameters by tying off the excess length, or by doubling-up the coil. The pickup loop comes with a 10 foot long coax cable, and this cable may be greatly extended in length if necessary. Flexible loop pickups are not tuned to a particular channel and may be used for either Channel A and B transmitters, or both.

Miniature Stub Pickup (for AT-5000 and AT-7500 battery powered telemetry):



The miniature stub pickup is a 1 5/8 inch long, 7/16 inch diameter pickup has windings on a ferrite rod and connected to a 10 foot long coaxial cable (BNC terminated). The stub pickup is convenient to use for applications involving shaft sizes up to 2" (50mm) diameter. Care should be taken to mount parallel to the shaft axis in the AT-5000 EasyApp system, and radially as close as practical. Metal clamps over the miniature stub should be avoided. The stub should be mounted with spacing (.125" or more) from metal surfaces for best performance. The cable length may be extended in length with other coaxial cabling.

Miniature Stuba are sold for a particular frequency channel. Channel A and Channel B units are internally different are not interchangeable.

Dual Miniature Stub, with RF Splitter/Combiner Adapter: (for AT-5000 and AT-7500 battery powered telemetry):



For shafts of 2 to 4 inches in diameter (50 to 100mm), or for applications where a single stub pickup capability is interfered with by metal structures or other interference, the use of a second stub and an RF splitter/combiner is often the preferred configuration. The two stubs are mounted on opposite sides of the shaft and the BNC connectors at the other end of their 10 foot long cables are plugged into the Splitter/Combiner. A short BNC cable takes the combined signal from both stubs from the Splitter/Combiner to the telemetry receiver. A BNC Tee connector may be used in place of the splitter/combiner, but care should be taken to test the setup due to reflected signals or impedance mismatch (verify good signal strength via the RF signal strength output from the AT-5000 or AT-7500).

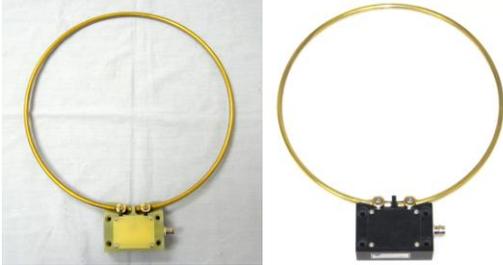


Tuning Enclosure (for inductive powered systems):

A tuning enclosure is typically supplied for induction powered applications. The tuning enclosure

allows for minor variations in mounting the RF coil nearby metal, and is connected to the coil by 18" or less of twisted pair wire. A coax cable (typically RG58) connects the tuning enclosure to the receiver.

Brass Loop Coil:



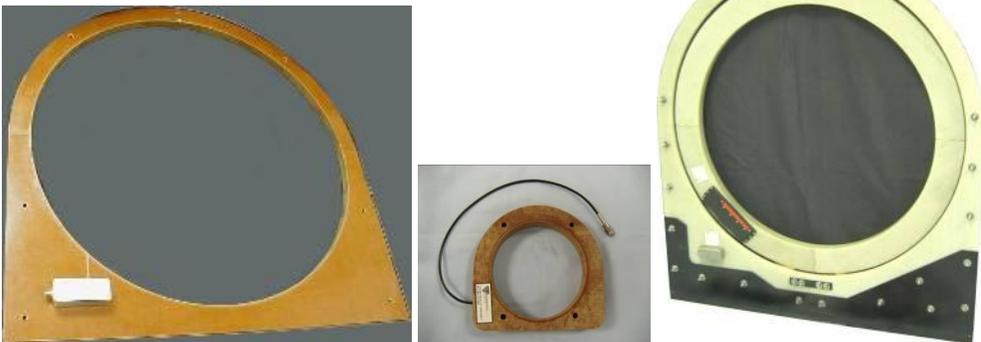
A rigid brass loop pickup design (1/4 inch diameter solid brass wire, shown with and without integral tuning enclosure in the base) is used for both inductive (close coupled power and data) and battery (more spacing allowance) applications. The brass loop is mounted to a G10 or GaroliteXX base, (3.0 by 1.25 by 2.375 inch) which is connected to a BNC cable. The brass loop is sized to a specific application shaft diameter.

As with the flex loop designs discussed earlier, pickups for battery systems are not tuned to a particular channel and may be used for either Channel A and B transmitters, or both.

For induction powered systems (AT-4400, AT-4500, AT-7000, AT-7600), the BNC cable is typically 24 foot long (and should NOT be lengthened for AT-4400 and AT-7000 systems, as this will affect RF tuning; contact Accumetrics if longer lengths are needed). Brass loop pickups sold for battery powered systems should not be used for induction applications, although the converse can sometimes work.

Rigid Phenolic or Glass Laminate (G10) Composite Pickup Loops

The composite pickup is constructed from a phenolic or G10 glass laminate or similar material. The material thickness ranges from 1/4" to 1" thick depending on diameter and environmental needs. These loops are suitable for diameters from a few inches to a few feet. This style of pickup is typically used on permanent induction powered installations where high levels of robustness are required.



SELECTION GUIDE

<i>Pickup Style</i>	<i>Battery or Induction Telemetry</i>	<i>Applicable Shaft Diameter</i>	<i>Comments</i>
<i>Miniature Stub</i>	Battery only	0.9 to 2"	This is a ferrite based pickup suitable for small diameter shaft use. Orientation and distance are important.
<i>Dual Miniature Stub with Power Splitter/combiner adapter</i>	Battery only	2" to 4"	The use of two stubs, with an RF splitter/combiner, allows greater range of operation.
<i>Flexible Loop</i>	Battery only	0.9" and larger	A very effective wire loop which normally surrounds the shaft and is supported from existing structure around the shaft or by a user provided support frame. Normally used on larger diameter shafts, this flexible wire style pickup can be custom sized to accommodate smaller diameters by tying excess length off, or by looping multiple loops. This design operates over much greater range of shaft diameters than the stub design.
<i>Rigid Brass Loop</i>	Battery or Induction	0.9" and larger	This style of fixed diameter is the standard configuration for most induction powered installations and an option for battery systems. This is a very effective pickup for battery systems.
<i>Phenolic/G10</i>	Battery or Induction	0.9" and larger	Highly rugged construction fixed diameter loop which is embedded in phenolic for high vibration, wet or corrosive environments.

Mounting of Pickup Loops:

Pickups should be mounted axially even with the transmitting coil, and radially spaced as close as practical.

Stub pickups: The stubs should be mounted so that the length of the ferrite stub is parallel to the transmitting coil (typically parallel to the axis of the shaft).

Pickups work best when spaced away from metal surfaces (even small spaces are better than none at all). To avoid detuning and energy loss in induction powered systems, the spacing between transmitting and pickup coils should be three or four times smaller than the space between either coil and continuous metal surfaces. Coils spaced less than 3" to metal should be tuned for the application; contact Accumetrics. (Coils tuned for open space will not work if placed an inch away from metal—and vice versa!).

Battery powered systems use coils for transmitting only the digital data signals, and may be placed at a greater distance than pickups used for induction power and data.

For induction power (where the coil acts as the primary of a 1 turn air-gap RF transformer), 3/8" or less spacing is typically used between transmitting and pickup assemblies.

For multiple AT-5000 systems operating on different channels at the same shaft location (two EasyApp transmitters on a single or on an adjacent strap), we recommend two different pickups, even if they are side-by-side.

On large systems, placement of the coils should accommodate the axial growth/ movement of the rotating shaft.

For high vibration, winds, or other extreme environments, consider Phenolic/G10 style construction.

Cable length from pickup to Receiver:

For Miniature Stub, Flexible Loop pickup, and Brass Loop pickups for battery powered systems, the cable length is not a significant factor affecting signal strength, and no tuning is required or available for changes in length. For these assemblies, any reasonable extension may be added to the 10 foot length of the cable. When extending cables, always use the same impedance cable (don't mix 75 ohm video coax in with your 50 ohm instrumentation coax).

For Induction powered systems running at 6.78MHz (AT-4400 and AT-7000), contact Accumetrics before modifying the cable length. Accumetrics tunes these assemblies to optimize both power and data transfer. Changes in cable length can have a significant affect on tuning.

---Call Accumetrics to discuss your specific needs, including custom designs for your application---

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