Accumetrics AT-5000 EasyApp Quick Guide:

- **Verify all components are present**
  - Transmitter and receiver, both of which are the same channel (A or B, located on each component)
  - Power/output cable
  - Pickup loop in one of the following configurations: miniature stub (channel A or channel B), brass loop, flexible loop, composite (phenolic)

- **Take the AT-5000 Receiver and install the power cable. Connect the power adapter to a wall outlet** (120VAC, 60 Hz), or disconnect the power adapter and directly use +12VDC.

- **Connect the pickup loop to the BNC connector on the receiver.** There are varied loops that can be used.

  Constructing the Flexible Loop, if so equipped:
  - The loop has a conventional 10' long BNC cable (that can be extended with other cables to any length desired); connect the female end of this 10' section to the BNC T connector
  - Find the loop section (white Teflon BNC cable labeled BT50054-XX where XX is the diameter of the loop). Note: this can be identified by looking at the connectors: one connector will be normal; <u>the other will have a male pin missing.</u>
  - Connect the loop section to the female connections on the BNC tee.

- **Align the pickup loop:**
  - **Flex loop, brass loop, or Phenolic/G10 machined pickup:** With the loop laying flat on a table, the AT-5000 EasyApp transmitter should be perpendicular to the table. The internal transmitting coil is in the side of the blue housing where the slit is.
  - **Miniature stub:** The miniature stub should be aligned so it is parallel with the drive shaft and radially outward from the Easy App. A plastic clamp should hold the stub to prevent signal loss.

  Moving the transmitter far from the loop pickup will cause the signal loss LED located on the front of the receiver to illuminate. The receiver is equipped with an RSSI output that can be monitored with a DMM on the receiver BNC connector labeled "RF SIGNAL STRENGTH" -(See general trouble shooting below for more information).

- **Connect the strain gage inputs via a connector, or solder to the pins on the EasyApp.** Monitoring of the torque/strain signal output and ground leads at the receiver data output cable (labeled "TORQUE SIGNAL") can be checked with a DVM after powering up the unit. Refer to the manual for gain and offset setting changes (gain is P1, offset is P2, DIPSW1 controls basic output functions—see manual).

- **Turn on the AT-5000 EasyApp and check the battery voltage with a DVM** by installing the battery (high temperature units), or turning on the switch (ensure that it is fully slid to the "on" position). The battery is inside the blue EasyApp package, and is located on the side of the housing labeled "battery cover". The voltage should be checked via a pin on one side (labeled with '+'), and a solder pad on the other side (labeled with '-'). The voltage of the battery should measure 3.4 volts with the EasyApp switch turned on (with a fresh battery). It is important to test with the system powered up! If it is under 3 volts, then replace by removing the only two slotted screws on the EasyApp. The "Battery Low" LED is an indication that the battery is close to the end of its life cycle and will cease to supply power fairly shortly. This is due to the battery power drop-off behaving in an exponential fashion at the end of its life cycle. (Battery life is about 50 hours for use with a 350 ohm strain gage; 150 hours for use with a 1000 ohm strain gage when using the FT50040.) NOTE: battery voltage should always be checked under load. The transmitter will send a "low battery" signal if the voltage is 2.7 volts or lower.

- **Verifying System Operation:**

With the transmitter connected to a full bridge, turn on the transmitter and receiver while monitoring the system output ("SIGNAL Out").

- If this is a DC coupled torque measurement, apply a shunt resistor across (in parallel with) the leg of the strain gage bridge from the "-IN " to "GND" This will produce a positive shift in the output of the system. The magnitude of this shift will depend on the bridge resistance, gain (sensitivity mV/V) of the transmitter, gain of the receiver, and the shunt resistance.
    - Some EasyApp units have an internal shunt resistor installed on the back of the gage input board. If this is in place, the resistor can be connected with an external shorting plug across the "SHUNT" sockets.
    - If the unit does not have an internal shunt resistor, then apply an external shunt resistor to the sockets labeled "SHUNT" on the Easy App.

- Another method to verify the system's operation is to produce a positive and negative full-scale.
    - Positive full scale: With the bridge connected to the Easy App's inputs, short the "GND" to "-IN" to produce a positive full scale.
    - Negative full scale: With the bridge connected to the Easy App's inputs, short the "GND" to "+IN" to produce a negative full scale.

Turn off the transmitter switch when you're done.

General Troubleshooting

Batteries

Single use lithium batteries are used for long life. Battery voltage should always be checked under load—if checked on the bench, an unloaded battery will look "good". Typical battery voltages are 3.4 volts for a new battery under load. At around 3 volts or less, the remaining battery life will be very short. The transmitter will send a "low battery" signal if the voltage is 2.7 volts or lower.

Received signal strength

The AT-5000 receiver has two outputs:

- TORQUE SIGNAL
- RF SIGNAL STRENGTH—this can be used to monitor how well your pickup coil is working

You can put a voltmeter (DC scale) on the RF SIGNAL STRENGTH line and any ground line ("Signal Gnd") and monitor how well your transmitted signal is being picked up by the receiver. The range for this signal is +5VDC to -5VDC, where +5VDC indicates complete loss of signal and -5V representing the strongest signal.

On a typical unit,

- **a very strongly received signal will give you -1 to -2 volts on the RF Signal Strength outputs**
- **a typical signal will be somewhere around 0 to 2 volts,**
- **a weaker signal will be around +3 volts.**

The "SIGNAL LOSS" (dropout) LED illuminates at about +4.5 volts (factory setting), and the "Battery Low" LED flickers at around +4.9 volts. The data will be perfectly transmitted until dropout starts to occur, so keeping the signal strength voltage below 4 volts through 360 degrees of shaft rotation is important. In high EMI areas, a higher signal strength should be set up; the signal strength may need to be 3 volts or lower. The thresholds for the LED's to turn on can be changed; individual systems may vary somewhat.

Troubleshooting Pickup Loops:

Loops should not be covered/ clamped with metal or other materials that will shield the RF signal. Metal clamps or metallic content body tape can be troublesome.

Pickups should be relatively closely spaced (under a foot radially) to the rotating transmitter, especially in the vicinity of metal. See above to measure the signal strength. Multiple loops can help a little, and can be stretched out axially to cover a larger pickup range. Tie-wrapping excess loop circumference won't hurt (go for a big loop).

If a metal bracket or wire is used to support the flexible loop, some signal loss occurs if the metal connects to a common ground on both ends (which allows eddy currents to flow in the conductor). Again, monitor the signal strength when setting up the pickup.

If extremely poor signal strength is found, check the pickup's physical integrity:

- For a Flexible loop, a basic continuity check consists of disconnecting the extension lead at the receiver (10 foot BNC RG-58 cable) and checking the resistance of the inner pin of the BNC connector to the outer metal part of that same connector (shield connection). A resistance of 0.5 to 1.0 ohms should be read on a meter if the cable is intact. A high/ open resistance could indicate that the loop wire or the 10 foot lead has become intermittent. The same check can be done at the BNC T connector (at the beginning of the loop) to eliminate the possibility of the extension lead being a problem. The Teflon loop cable can be yanked from the connector and cause problems.
- For a Brass loop, check the tightness of the brass loop mounting nuts. A low resistance should also be able to be measured as noted for the Flex loop above.
- A temporary simple pickup loop, if needed, can be constructed by a using a loop of conventional wire around the shaft that is soldered to the shield and the center conductor of an unterminated coaxial cable that leads to the receiver.

Stub pickups should be axially well aligned with the Transmitter, and must match the transmitter frequency (Channel A transmitter must be used with a Channel A stub and a Channel A Receiver). Stub pickups can be convenient on small diameter shafts (1 to 2" OD), but the Flexible Loop or Brass Loop pickups are more universally effective, and can be used with any Channel transmitter. Use the brass or flexible loops for large shafts or for better signal strength in general. With stubs, avoid clamping the ferrite too hard, avoid the use of a metal clamp, and try to provide a little spacing off of a metal surface. Orientation and axial mounting that matches the Transmitter mounting are important. Signal loss will occur if the transmitter is shielded by a large shaft from the pickup stub(s) on the far side of the shaft. Using two stubs with a power divider/combiner can be effective; a simple BNC T will also work, with some loss.

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