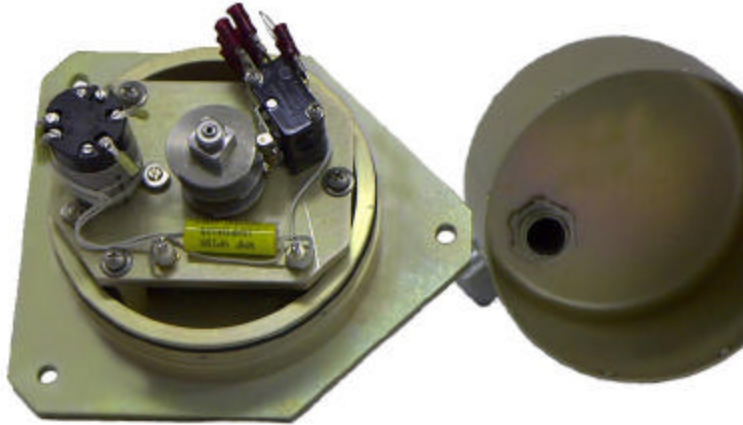




# Position Encoders



4:1 Position Encoder



Synchro Transmitter

## Position Encoders Overview

Position Encoders, provided and developed by Bradshaw Communication Systems, provide absolute angular feedback when mechanically coupled to an earth station antenna. The antenna is most commonly a steerable parabolic reflector with three axes of motion.

There are primarily two variations of position encoders provided by BCS. A 4:1 Position Encoder primarily used on the azimuth and elevation axes and a Synchro Transmitter primarily used on the linear polarization axis. Both are shown above.

The 4:1 Position Encoder uses a combination of gears, cams, and a Synchro Transmitter to provide angular position feedback to the Antenna Control Unit. A 4:1 speed up gear ratio is provided from the input shaft of the Position Encoder to the synchro. High accuracy spring loaded anti-backlash gears are utilized to provide this gearing. The 4:1 gearing allows the synchro to provide higher resolution feedback. However, this ratio means that the synchro rotates four revolutions for each revolution of the input shaft. Therefore, the synchro can only sense 90 degrees of axis rotation and another means must be provided to determine the proper quadrant of operation. Quadrant determination is accomplished by means of three sets of cams and switches. The cams actuate the switches as the input shaft rotates. The three switch settings at any given angle of rotation allow quadrant determination by the Antenna Control Unit.

The Synchro Transmitter is a variable-coupling transformer whose input shaft rotation causes a variance in the magnitude of the output voltage in reference to its input voltage. When the synchro is connected to the Antenna Control Unit, its output signals are converted to an angular position in accordance with the angular position of the input shaft.

BCS Position Encoders have been developed for use in new systems as well as to replace obsolete ElectroSpace Systems Position Transducers. By re-creating an identical form factor and maintaining the same pin for pin connectivity, simple plug and play upgrades in existing systems can be realized. Many advantages (in both installation costs and system down time) make BCS Position Encoders the clear choice when replacements or upgrades are required. With performance equaling or bettering the original factory equipment, system accuracy and integrity can be maintained. For new system installations, the long established reliability and performance track record of the ElectroSpace Systems hardware (that is fundamental in the BCS Position Encoders) provides the new system operator with the high level of confidence needed in a new system from start-up to long term operation.

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## Position Encoder Specifications

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- **Antenna Control Unit Interface**
  - BCS ACU1 or Electrospace Systems 93C-23
- **Accuracy**
  - Synchro Transmitter = 0.08° RMS
  - 4:1 Position Encoder = 0.02° RMS
- **Power Requirements**
  - Both are powered by the Antenna Control Unit
  - 85VAC 400Hz for Synchro Transmitter
  - 12VDC for 4:1 Position Encoder Switches
- **Cable Entry / Termination**
  - 4:1 Position Encoder supplied with weatherproof cable gland.
  - Synchro Transmitter supplied with terminal lugs and screws.
- **Physical**
  - Synchro Transmitter must be protected from direct rain exposure and is primarily used in polarization feed rotation measurement located in the antenna hub.
  - 4:1 Position Encoder is NEMA 4X rated for direct exposure to rain and weather.
  - Both feature stainless steel input shafts
  - Dimensions & Weight - Refer to Interface Control Drawing
- **Environmental**
  - -40 °F to 122 °F, 100% humidity (-40 °C to +50 °C, 100% humidity)

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## Conclusion

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With over 40 years of combined experience in the Satellite Communications Industry, Bradshaw Communication Systems (BCS) has the solution to get your job done right and on time. By providing extremely high quality products and services at economical prices, BCS has become a respected name in the industry and the right choice when it comes to satellite earth station antenna products and services. BCS has provided custom solutions for numerous customers and stands ready to provide components, systems, and services to best fit your specific requirements. Please contact BCS today regarding your requirements.

