Position Measurement & Control - April 2002 (S050D)

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NEW PRODUCT ANNOUNCEMENT

Position Transducer Installation Kit

Easy Installation Is Now Even Easier!

After 18 months of extensive research and testing, our 160001-01 installation kit for position transducers is now available. SpaceAge Control position transducers are known for their ease of installation. With the 160001-01 installation kit, installation is that much easier. The kit includes tools and accessories for displacement cable cutting and crimping, mounting base and related hardware adjustment, and displacement cable leader construction.

Contents of the 160001-01 installation kit for position transducers

Shipping immediately, the installation kit includes:

- crimp tool
- displacement cable cutting shears
- annealing heat source (matches)
- ball-end plugs (20)
- loop sleeves (20)
- swivels (10)
- pull rings (10)
- copper sleeves (10)
- thimbles (10)
- hex wrenches (3 sizes)
- screwdriver
- 0.018-inch (0.4572 mm) dia. 7x7 displacement cable (10 feet (3.048 m))
- 0.027-inch (0.6858 mm) dia. 7x7 displacement cable (10 feet (3.048 m))

The installation kit for position transducers gives these benefits:

- Easy to Use - crimp cables in 30 seconds
- Proven Performance - all components are used by our own electromechanical technicians
- Compact - sturdy storage box is 11" x 2" x 7" (279 mm x 51 mm x 178 mm)
- Complete - over 10 tools and accessories
- Affordable - the entire kit is less than the price of most standalone crimp tools!

For more information on the installation kit and installation instructions, view our Installation Guide.

APPLICATION CORNER

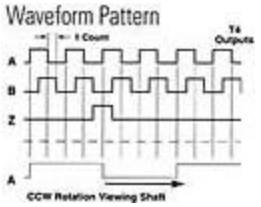
The Application Corner answers your questions about using position transducers in specific applications. If you have an application question you would like answered, please let us know by phone, fax, e-mail, or mail.

Interfacing with Quadrature Output Position Transducers

Q. We are using your new Series D61 digital position transducer. What methods are there for reading the electrical outputs from these units?

A. Quadrature output can be read from a variety of devices including (possible sources are shown in parentheses):

- digital meters (U.S. Digital, Texmate)
- RS-232 and USB interfaces (B&B Electronics, U.S. Digital)
- PLCs
- data acquisition boards with digital inputs
- custom-made interfaces using counter and frequency components (Agilent)

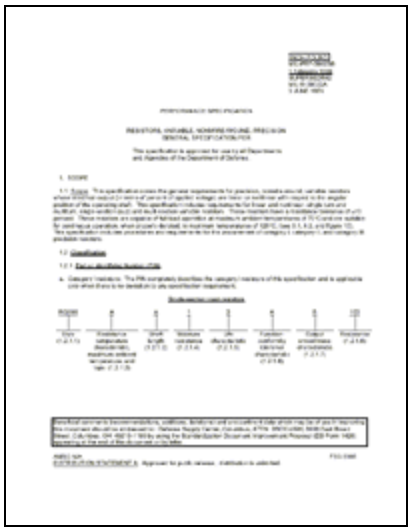


Quadrature Outputs
(Source: BEI Technologies, Inc.)

Military Standard Rating

Q. Are your position transducers rated to any military standard?

A. While there is no general military standard for position transducers, the broad majority of our analog position transducers use potentiometers designed to meet the stiff requirements of MIL-PRF-39023B, "General Specification for Variable, Nonwire-Wound, Precision Resistors." If you would like an electronic copy of this standard, please contact us.



MIL-PRF-39023B

Analog Versus Digital

Q. Our control system can use either a digital signal or an analog signal. What factors should I consider in choosing between your analog- and digital-output position transducers?

A. The items below show some differences between the two technology types. In general, if you need absolute position information that includes knowing where the object being monitored is at time of power up, then analog (potentiometer) technology is the preferred sensor. If you need relative position information or can live with moving to a reset position at time of power up, then digital (incremental encoder) technology might better suit your needs. For a given application, there is not an inherent price advantage in using one type or the other.

For certain applications, other rotary sensors such as absolute encoders, synchros, resolvers, and RVDTs offer benefits not found in potentiometers and incremental encoders. If you would like assistance in selecting the proper sensor for your application, please contact us or request the *Selecting Position Transducers* article.

Digital (Incremental Encoder)

- Advantages
  - non-contact sensor with lifetimes often in the 100 millions of shaft revolutions
  - not typically affected by noisy environments
  - accuracy can ultimately be higher (for a price)
- Disadvantages
  - relative output that requires resetting to a zero point at power on time
  - interfacing and programming can be trickier

Analog (Precision Potentiometer)

- Advantages

- absolute signal (power cycling does affect output at power on)
- easy setup with usually little programming involved
- broader environmental operating ranges

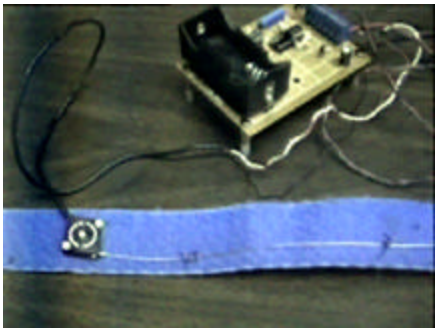
- Disadvantages
  - limited rotational range without gear reduction
  - contact sensor with lifetime often limited to 5 million shaft revolutions on multi-turn units
  - circuit noise can affect measurement accuracy

IN ACTION

Every month we see numerous fascinating applications of our position transducers. Here are a few recent ones:

Breathe In, Breathe Out (Stanford University) The Department of Radiation Oncology lab at the Stanford University School of Medicine is studying the human respiratory cycle as part of a project to develop automated surgical tools that respond to organ motion during regular breathing. One simple, effective way to detect and record breathing is to measure the expansion and contraction of the chest.

For this purpose researchers attached a Series 150 position transducer to an elastic belt that is wrapped around a subject's chest or abdomen. As breathing causes the belt to expand and contract, the transducer converts the movement to a variable voltage that is proportional to the amount of expansion. The transducer offers negligible resitance to the subject and produces a signal that accurately tracks the breathing cycle. By converting the variable voltage from the transducer to a variable audio frequency, the breathing signal can be recorded simultaneously with a video of the subject's breathing using a VCR.



Series 150 position transducer shown on mounted on organ motion belt.
Photo credit: Martin Murphy PhD, Stanford University School of Medicine

Next Generation Hybrid Electric Vehicle (HEV) Development (UC Davis) The UC Davis FutureTruck team is using Series 174 position transducers to monitor pedal (accelerator) travel in the HEV Explorer. Use of the Series 174 allows the team to install along a curved path without special fixturing and reduces the number of pedal calibrations required.

Deciding where the position transducer should go on the HEV Ford Explorer.
Photo credit: UC Davis FutureTruck Team

Waste Water Level Monitor (NASA Marshall) Modified Series 161 position transducer are used to monitor waste water levels in the International Space Station (ISS). For more details on ISS wastewater recycling, visit http://science.nasa.gov/headlines/y2000/ast02nov_1.htm

Modified Series 161 position transducers will be housed in Node 3 of the International Space Station, which is scheduled to be attached to the station in October 2005.
Photo credit: NASA (http://science.nasa.gov/default.htm)

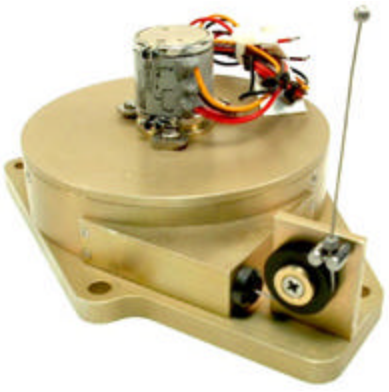
NEWS YOU CAN USE

Some updates and reminders regarding SpaceAge Control . . .

Special Offers Including a FREE Position Transducer

Have you seen our Special Offers? Check out our free offers and valuable application information that include:

- FREE Transducer Offer
- Evaulation Position Transducer
- Educational Transducer Program
- *Selecting Position Transducers* Article
- NASA Publication 1046 (Measurement of Aircraft Airspeed and Altitude)
- Custom Solution Request



Get a FREE application-specific design for your review!
(Product shown: quantity level sensor for bellows assembly)

Standard Warranty Is Now 12 Months

Our standard warranty has been increased from 90 days to 12 months effective 15 January 2002. Contact us for more information on our optional extended warranty that extends the standard warranty for up to 24 additional months.

For our complete warranty statement, see our Policies and Conditions.

Representatives for Finland, New Zealand, and Southeast Asia

SpaceAge Control products are exclusively represented in Finland by INTOTEL OY, in New Zealand by Mandeno Electronic Equipment Limited, and in Southeast Asia (Indonesia, Malaysia, Phillipines, Singapore, and Thailand) by Kenda Pte Ltd. We look forward to working with INTOTEL OY, Mandeno Electronic Equipment Limited, and Kenda Pte Ltd to meet the position measurement challenges in these regions of the world. For other SpaceAge Control representatives, visit our Representatives page.

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Comments and Questions

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