

Position Detection in Aerospace Applications

An Application Note

Background

Aerospace design engineers require infinite resolution linear position solutions that are reliable in harsh environments to provide high aircraft performance from a stable supplier. These customers also require engineering support and faster design cycle time to meet aircraft project milestones. Honeywell's Linear Variable Differential Transformers (LVDT) platform does this by offering a pre-validated, flexible, configurable platform with a variety of channel, stroke, mounting, and termination options as demonstrated by our heritage in providing high quality products within the aerospace industry.

Solution

Honeywell's new aerospace LVDT provides infinite resolution linear position solutions designed for use in harsh environments. They are an ideal product to be used on next generation aircraft which require expedited design cycle time from an experienced, stable supplier with an extensive aerospace product install base. LVDTs can be used to measure the positions of numerous mechanisms throughout an aircraft. Common mechanisms employing LVDTs for system measurement are:

Primary and secondary flight controls (PFC/SFC) – Flap, slat, and spoiler position. LVDTs can be used to detect mechanism positions within flight control actuation systems. For aircraft with multiple slats or flaps, it is imperative to ensure that all panels/surfaces work in concert. It is critical that there are no left versus right asymmetries in the flaps and slats when they are deployed.

LVDT position data supports this goal by helping to direct flight control actuation systems, thereby contributing to the proper execution of pilot inputs to the controls (which can also internally utilize LVDTs). The data can also be used to drive the flight instruments that provide feedback to the pilot, and to provide the flight computer with data used in other aircraft system logic. (ex: flaps detent changed by pilot and flap in transit and position displayed on cockpit instrument. This is important to the pilot because a pilot cannot visually see the flaps from the cockpit).

Engine mechanisms and valves. LVDTs can also be used to detect positions of engine linkages or valve states. They may be used on engine linkages and many types of aerospace valves to detect movement and current position, then provide that data for use in visual indication of



movement to the pilot via instruments in the cockpit and/or within the flight control computers.

Honeywell's LVDT delivers enhanced reliability in engine mechanisms and valves through improved mean time between failures (MTBF) through industry leading winding techniques and high-strength material selection.

Nose-wheel steering. LVDTs can be used to detect the state of the landing gear nose wheel. As with engine mechanisms and valves, Honeywell's LVDT delivers enhanced reliability through improved MTBF through industry leading winding techniques and high-strength material selection.

Pilot controls. LVDTs can be used to detect movement and current position of the yoke. The primary flight control inputs are then transferred to the flight control computer for use by control surfaces. They deliver enhanced reliability and durability through improved MTBF through industry-leading winding techniques and high-strength material selection. Their infinite resolution linear position provides exact pilot control system positioning.

Features and Benefits

- Platform approach: Reduces customer design cycle time and increases revenue (speed to market) while minimizing cost to serve (minimizes engineering investment)
- Ease of integration: Install time, rig point position to eliminate shimming
- Enhanced reliability: Improved MTBF through industry-leading winding techniques and high-strength material selection
- Supplier stability: Minimizes cost to serve and ensures reliable, timely supply

- Global engineering and application expertise: customers with a global footprint can rest assured that there is local support for new applications and troubleshooting.

Figure 1. LVDT Position Measurement Applications for Aircraft



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