

PGA970 Use Case for LVDT Applications



Introduction

There are many sensors and technologies used to measure the position and distance, such as magnetic sensors, ultrasonic sensors, inductive sensors, and so forth. Which technology is used in the application is determined by two main factors: distance and accuracy.

The LVDT is one application that can measure precise positions and distances within short movements.

LVDT

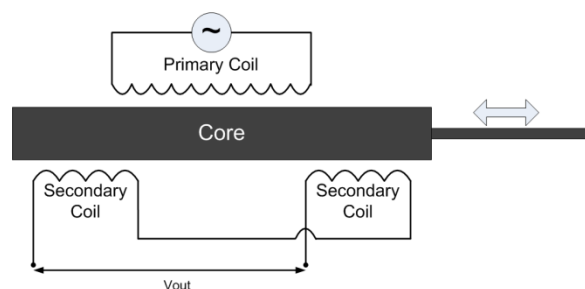


Figure 1. LVDT Mechanism

Figure 1 shows the LVDT mechanism that can precisely measure very small positions of change. The LVDT consists of the core, the primary coil, and two secondary coils. The core is free to move within hollow body, and the AC signal is applied to the primary coil. The magnetic flux made by this is coupled by the core to two secondary coils. When the core is placed in between two secondary coils, each secondary output voltage is same value and V_{out} is 0 V. The movement of core can be detected to measure the V_{out} .

The benefits of the LVDT are:

1. It has solid and robust construction that works in harsh conditions.
2. It produces high voltage change for very little movement.
3. It suffers no damage if extracted outside of the working range.
4. It is cost-effective and has an extended lifetime.
5. It can measure distances precisely.

The RVDT can withstand extreme environments and can therefore be used inside aircrafts, hydraulics, downhole drilling, and oil drilling equipment.

PGA970

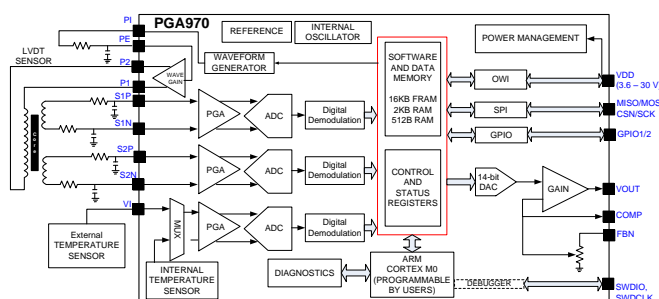


Figure 2. PGA970 Block Diagram

Figure 2 shows the PGA970 Functional Diagram. The key features for the PGA970 are:

- Wide supply range : 3.5 V to 30 V
- Integrated waveform generator to primary coil (1 KHz to 20 KHz)
- Two differential input channel with 24-bit ADC
- One ADC for external or internal temperature sensors
- Integrated on-chip ARM M0 MCU (1-MHz to 8-MHz frequency)
- 16KB FRAM
- 14-bit DAC with amplifier (0-V to 5-V ratiometric output, 0-V to 10-V absolute output)
- PWM output
- Communication I/F : SPI and OWI
- Two GPIOs

The device diagnostics, sensor diagnostics, and integrated temperature sensor provide protection and information about the integrity of the overall system and sensing element. The device also includes a gate-controller circuit which, when used with an external depletion MOSFET, can regulate the device supply voltage in systems where the supply voltage exceeds 30 V.

Table 1. Adjacent Tech Notes

SLYA027	PGA970 Use Case for RVDT Applications
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