Honeywell

Application Note - Transportation

Value Added SMART Position Sensors, Arc Configuration, for Boom/Sprayer Arm Angle Position Sensing

Background

Skid loaders and agricultural sprayers use a mechanical linkage called a planar pivot joint to provide articulation of their booms/sprayer arms. boom/sprayer arm angle position is critical in the use of this equipment, especially for advanced features that can improve efficiency, enhance operator and bystander safety, and reduce operator stress, such as:

For Skid Loaders:

- Automated repetitive motion sequences, such as dig-dump-dig, which then require only a single movement of a joy stick to repeat.
- "Envelope control" or keeping the equipment within a safe extension range.
- Digging arm position, along with equipment position via GPS (Global Positioning System), to provide real-time survey information, such as hole width and depth, eliminating surveyor costs.
- Cab/digger alignment calculation and notification to the equipment operator, eliminating the need for the operator to twist his/her head to see the digger, especially in uneven environments.
- Bucket/attachment height position/restriction which helps to avoid overhead power lines or other obstacles in the area.

For Agricultural Sprayers:

- Accurate and repeatable sprayer arm positioning for varying terrains and changes in crop canopy to evenly and efficiently deliver fertilizer or pesticides where they are needed, reducing chemical consumption and increasing crop yield, and helping to avoid obstacles in and around the field

Solution

The SMART Position Sensor, Arc Configuration, may be used in these applications (see Figures 1, 2, and 3).

Figure 1. SMART Position Sensor, 100° and 180° Arc Configurations

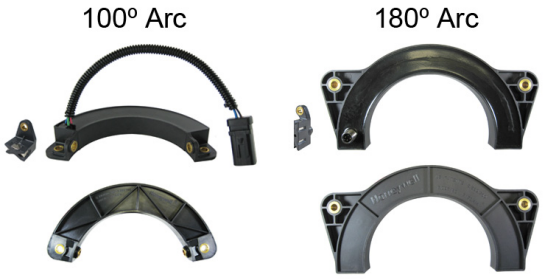

Figure 2. SMART Position Sensor, Arc Configuration, used for boom angle position sensing

Figure 3. SMART Position Sensor, Arc Configuration, used for sprayer arm angle position sensing

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Use in the Application (see Figure 4)

The SMART Position Sensor, Arc Configuration, consists of two parts: the sensor itself and a magnet actuator.

The sensor is mounted on a fixed housing in the boom/sprayer arm, and the magnet actuator is mounted on the moving pivot joint. Any change in the pivot joint angle causes the relative position of the moving magnet actuator to the fixed sensor to change, providing an output.

Benefits

- One of the most accurate and durable non-contact positioning devices available in the industry
- Provides accurate and repeatable angle position sensing
- IP67, IP69K environmental sealing protects against dust and wet conditions
- Wide temperature range (-40 °C to 85 °C [-40 °F to [185 °F]) allows for use in hot and cold environments
- Non-contact technology reduces end user replacement requirements and OEM warranty exposure

See Table 1 for a complete list of features and benefits.
For more information on this product, click here.

Figure 4. SMART Position Sensor, Arc Configuration, in a boom pivot joint

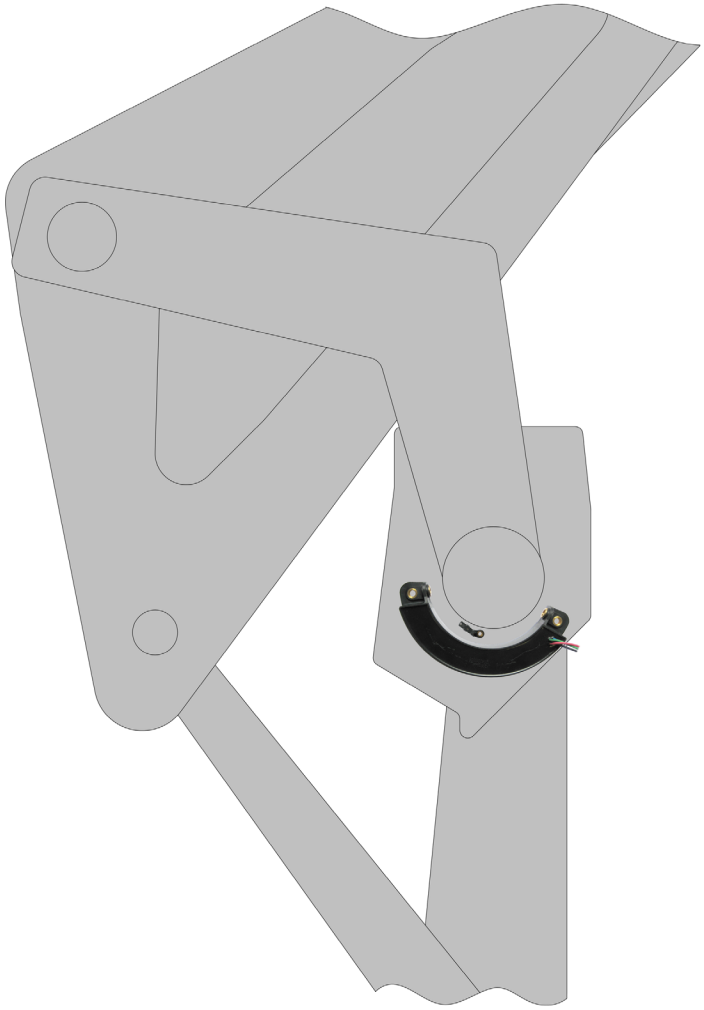

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Table 1. SMART Position Sensor, Arc Configuration, Features and Benefits

SMART Position Sensor, 100° and 180° Arc Configurations	Features and Benefits (★ = competitive differentiator)
100º Arc SPS-A100D-HAMS SPS-A100D-VAMS SPS-A100D-HAWS SPS-A100X-LAAS0401 (Bottom - All Views) 180º Arc SPS-A180D-HAMS SPS-A180D-VAMS (Bottom)	★ **Reliable, durable:** Non-contact design reduces wear and tear, improving reliability and durability, minimizing downtime ★ **Easy to install:** Installation takes four steps (1: position device; 2: drill holes; 3: mount sensor; 4: locate magnet/connect sensor) vs. up to 14 steps some competitive products require, simplifying installation and reducing set-up costs • **Rugged:** Honeywell utilizes unique package materials with no moving parts within the sensor, making it resistant to vibration, shock, and extreme temperatures ★ **Flexible:** Air gap tolerance of 7,8 ±2,5 mm [0.307 ±0.098 in] or 9,2 ±2,5 mm [0.36 ±0.09 in] (100°) and 8,5 ±2,5 mm [0.338 ±0.098 in] (180°) between sensor and magnet expands application use ★ **Cost effective:** Adaptable, non-contacting design allows customers to eliminate unnecessary connections for installation, reducing installation steps/time and components • **Accurate:** 100° configuration accurately measures values down to 0.06° while the 180° configuration accurately measures values down to 0.11° ★ **Adaptable:** Electronics on board allow for flexible packaging and component compatibility with existing systems ★ **Lightweight:** Lighter in weight than optical encoders ★ **Self-diagnostics feature:** Can reduce equipment downtime by providing predictive maintenance input • **Combined patented MR sensor and ASIC technology:** Provide enhanced differentiation and performance • **IP67, IP69K sealing:** Allows use in many harsh applications • **RoHS-compliant materials:** Meet Directive 2002/95/EC

Find out more

To learn more about Honeywell's sensing and control products, call **1-800-537-6945**, visit **sensing.honeywell.com,** or e-mail inquiries to **info.sc@honeywell.com**

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

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000757-1-EN
August 2013
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