BODINE ELECTRIC COMPANY

# engineered solutions

from Bodine Electric Company

## Built-in Encoder for Precise Motion

**Assisted Steering System** / Farm Equipment

### Incodermotor Steers Straight Course

Precision Agriculture has progressed by leaps and bounds in recent years, as shown by the number of products on display at this years' National Farm Machinery Show (**click here** for photos). One such product is GPS-guided automatic steering of tractors, combines and other farm vehicles. They range in sophistication from assisted steering systems where there is still a driver, to completely autonomous vehicles such as an unmanned tractor that pulls a wagon behind a combine.

Bodine Electric Company was an early participant in this new technology, working with an OEM manufacturer on an assisted steering system. The customer needed a 12 Volt DC motor (**click here** for more about Bodine low voltage products) that could be powered from the tractor's battery. It would drive a spring-loaded roller wheel mounted to the tractor's steering wheel. For the device to work with the GPS-guided servo controller, it needed an encoder (**click here** for more about encoders) to indicate the precise position of the motor shaft.

Bodine engineers considered a number of encoder designs (**click here** for more about encoders from our *Handbook)*. Our engineers recommended that the encoder be located within the metal frame of the motor, as the device would be used in a rugged outdoor environment and it would be traveling on rough terrain. The engineers determined a magnetic 2-channel encoder with hall sensors, and a resolution of 30 pulses per revolution would be most suitable for this application. For better performance Bodine included EMI protection. After nine years of production, the robust design is still going strong.

**Bodine brings over 100 years of problem solving experience to a wide range of applications in industries as diverse as medical, packaging, industrial automation, farm/agriculture, and solar powered outdoors equipment. We look forward to working with you on your next fractional-horsepower gearmotor design challenge.**

### application insights

#### The Design Requirement

**A GPS guided assisted steering system required a battery-powered motor-encoder combination for use in a rugged outdoor environment.**

#### The Solution

**Bodine developed a unique low-voltage DC motor with a built-in magnetic encoder.**

INcodermotor

**Bodine type 33A3BEPM DC motor with internal encoder (click here for more information about our Incodermotors)**



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