



## Watson Industries Application Notes

### Vehicle Crash and Rollover Testing

Occupant safety in a vehicle crash is the primary reason for crash testing vehicles. Such testing is an important part of the design validation process for a new vehicle. Since this testing is so expensive, it is



important to acquire detailed and highly accurate data for each test. It is also important that the sensors in the vehicle that record the event be rugged enough to provide accurate data throughout the crash. If the sensors are destroyed in a crash, the cost of testing will go up significantly.

When a vehicle is crash or rollover tested, data must be acquired in all axes of motion in order to reconstruct the most accurate picture of the test. This means that a triaxial angular rate sensor is required. Watson Industries produces the ARS-E332-3A, which is ideal for the vehicle testing industry. It provides triaxial rate outputs and is durable enough to survive the shocks involved in crash and rollover testing.

#### **Technical Challenges:**

The difficulties with providing a sensor for this application are related to the high shock environment. For vehicle crash and rollover testing, accuracy and uninterrupted operation through high shocks is needed along with a durable design to promote survivability.

The Watson ARS-E332-3A contains our most rugged gyros to meet the shock and survival needs of this demanding application.

#### **Watson Experience:**

Watson Industries has been producing ARS sensors for this market since 1997.



#### **Watson Industries, Inc.**

3035 Melby Street Eau Claire, Wisconsin 54703 U.S.A  
Phone: +1 (715) 839-0628 Fax: +1 (715) 839-8248  
e-mail: support@watson-gyro.com Website: www.watson-gyro.com

## Requirements:

- Rates – 500°/sec all axes. Custom rate ranges are available to suit your needs.
- Bandwidth – 80Hz
- Shock – 500 G's
- Axis Alignment – Less than  $\pm 1^\circ$  of each other.
- Repairable / Serviceable construction

## Applicable Products:

- Pro Gyro®
- ProAccel®
- ARS-C332-3A
- ARS-E332
- ARS-G152
- DMS-E604
- DMS-EGP01
- DMS-EGP02

## Typical Options:

We are able to accommodate your custom needs. Shown below is a listing of our most common custom modifications.

- Digital velocity input – Watson can support digital velocity inputs in many formats such as GPS and Airspeed Indicators.
- External GPS reference – We have built custom units that utilize GPS data as a reference.
- Custom specifications – For certain applications, customers require specifications that are different from our standard units. Watson Industries engineering is willing and able to accommodate these needs.
- Input Voltage – Many different input voltages can be accommodated.
- Output Format – Communications Protocols RS-232, RS-485, RS-422, USB, Syncro.
- Data Format – We have made many products with custom formatted data outputs.
- Sensor Ranges – The ranges for most of our sensors can be expanded or reduced to meet your requirements.

Options specific to this application:

- A triaxial accelerometer sensor can be added if required. The DMS unit has accelerometers standard.



## Watson Industries, Inc.

3035 Melby Street Eau Claire, Wisconsin 54703 U.S.A  
Phone: +1 (715) 839-0628 Fax: +1 (715) 839-0240  
e-mail: support@watson-gyro.com Website: www.watson-gyro.com  
05/19 DAO