APPLICATION STORY

Dragster Designer Relies on Unique Laser Sensor to Enhance Performance

Brian Duval, Publicity & Corp. Com.

Product: OADM20

Industry: Motorsports

The Application: According to Ola Nordell, president of Ola Nordell Motor Sports of Windsor, Connecticut, "Making horsepower for a drag racer is easy. Using it without spinning you tires off the rims is the hard part." On a quest to build and drive the 'fastest small-block Chevy' in the world, Nordell is an expert at engineering and driving drag racers and is know for his "launch".

Nordell's drag car weighs only 1400 pounds, yet its engine produces 1400 horsepower of nitrous oxide injected fury. Less than one second after the light goes green, the car is going more than 60 miles an hour, with a higher g-force than an F-16 launching off an aircraft carrier. After two seconds, the car is traveling well over 120 miles an hour and still accelerating hard, struggling to keep its monstrous rear tires from losing traction. Over the next few seconds, the car reaches speeds in excess of 200 mph while the driver labors to keep the car's four-inch wide front tires going straight on a racing strip only yards wide. When the race is over, the car has traveled a full quarter mile in less than 7 seconds.

Diagram I:
The car in action

Nordell's goal is to engineer top alcohol dragsters that win races. The current car is designed with a chrome alloy frame, magnesium and carbon fiber body, and a totally custom motor. Unique systems are used to monitor performance during the race, including a 32-channel datalogger and a PLC that track various motor and transmission functions. By monitoring the car's systems in post-race data analysis, the driver can tune and adapt driving strategies to improve the car's performance during the race.

The Baumer Solution

The higher the rpm's at launch, the faster the car will accelerate. But if too much power is supplied and the rpm's rise too high, the tires will lose traction and spin, causing tire expansion. This tire spin may lose Nordell the race and could damage the motor. Nordell's goal is to launch under the highest power possible without losing tire traction.

Perhaps the most critical sensor in the all-important launch is the Baumer Electric analog output laser sensor. This sensor is mounted to the racer's rear frame, and measures the distance between the bottom of the frame and the ground. It detects tire expansion and contraction during launch. When the car is launched and the tires "squat", the distance between the frame and the track decreases. This change is measured, in high resolution, by the analog laser.

Baumer's OADM 20 analog output sensor accurately measures distances as small as .01 mm, and sends measurements to the datalogger throughout the race, providing ongoing information on how much and when the tires compress or expand and reporting

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Diagram II:
Operating principle of the OADM

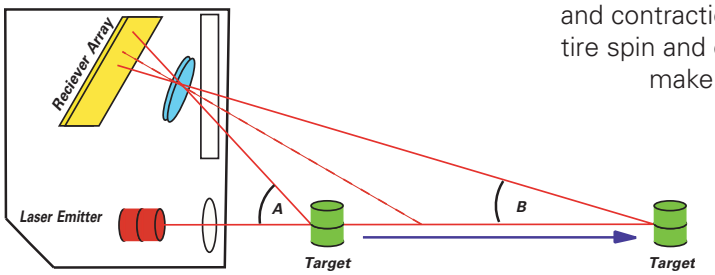
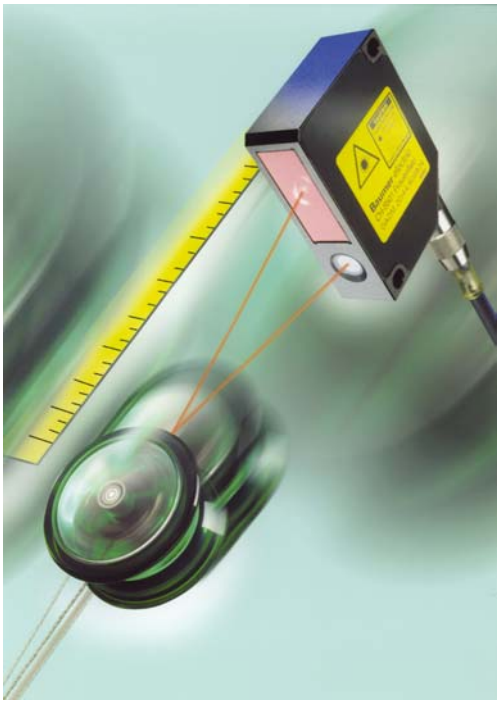


Diagram III:
The OADM



any spikes in tire diameter that indicate tire spin. After the race, analysis of this data allows Nordell to adjust launch rpm and tire pressure to be certain that all available horsepower makes it to the ground. He tracks tire growth and contraction versus rpm's and tire spin and compares the data to make sure that the car is tuned and set perfectly.

According to Nordell, the OADM 20 was the only sensor available that could perform in this challenging, high accuracy application. Just the size of a pager, the sensor is compact, lightweight, and totally self-contained, requiring no outside amplifiers or signal conditioners and adding virtually no weight to the car. Featuring a class 3 laser, the OADM 20 is uniquely designed for outdoor and bright light applications where other sensors would experience accuracy problems. Unique among laser sensors, the OADM 20 flips the orientation of the receiving element, which delivers an extremely crisp and well-defined signal. Finally, whereas most triangulation laser sensors measure only the distance between two points, the OADM 20 offers multi-point linearization which averages distance over multiple measuring points for unmatched accuracy.

At a cost of about $1,800, Nordell used the Baumer OADM 20 to replace a $10,000 laser sensing system that was not as accurate. With this new system in place, he has been able to experiment and tune with each run of this first year car and the results are excellent. Nordell placed well in both of the races he's attended and has impressed even himself with his times. "I'm surprised that we've been able to go this fast in our first season with so few runs under our belt," he states, "It takes time and a lot of runs to get one of these cars set correctly and running competitively. With this laser and logging system on board, the guesswork is gone."

For more information on Baumer Electric's OADM 20 analog output laser, contact the technical department at 800.937.9336, dialing option 4.

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