



## Application note

# Optimizing race performance through precise tire temperature monitoring

### Sector

Automotive racing

### Application

Tire temperature monitoring

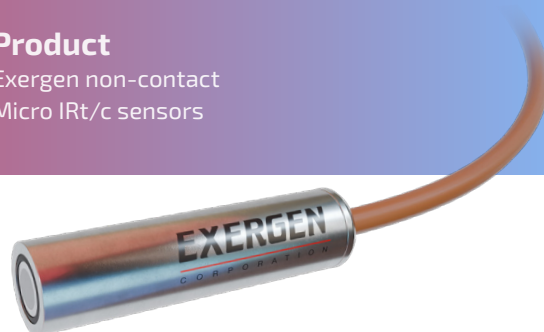
### Product

Exergen non-contact  
Micro IRt/c sensors

**Tire temperature critically affects racing performance through two key mechanisms. Temperature directly influences adhesion and wear characteristics – as tires grip curves lap after lap, excessive heat builds in contact areas, signaling when wear becomes uneven or excessive. Temperature patterns also reveal suspension setup issues. Out-of-tune suspension creates excessive loading on individual tires, causing them to run considerably warmer than others and wear much faster, forcing more frequent pit stops and lost track time.**

### Challenges

Racing environments demand sensors that survive extreme conditions while delivering accurate real-time data. Contact sensors cannot measure moving targets and risk breaking under track vibration. The electrically harsh environment of racing automobiles creates interference that compromises measurement accuracy. Space constraints around wheels limit mounting options. Pit crews need instant temperature readings to make split-second decisions about tire changes – timing these stops perfectly can mean the difference between winning and losing races.



## Solutions

Exergen Micro IRt/c sensors from CleverIR provide rugged non-contact measurement - perfect for on-board data acquisition. Measuring just 25.4 mm in diameter, they fit in tight wheel well spaces. The sensors connect to standard thermocouple readout systems for easy integration with existing data acquisition equipment. With response times of 100 milliseconds, they capture data every 2.5 wheel revolutions at 1500 RPM. Proper installation includes shield grounding to eliminate electrical interference and air purge systems to minimize dirt buildup on the lens.

## Benefits

Self-powered operation eliminates batteries and power supplies while avoiding electronic noise. Interchangeability error under 0.5°C (0.9°F) means replacement sensors deliver identical performance without recalibration. Repeatability within 0.1°C (0.2°F) ensures consistent measurements under the same conditions. The passive design delivers exceptional reliability with MTBF exceeding 1,000 years. Fast response captures temperature changes in real time, providing pit crews with instant data for critical timing decisions. Non-contact measurement avoids sensor breakage while enabling monitoring of moving targets without tire damage.



*IRt/c sensors deliver instant tire temperature data that helps pit crews optimize tire changes, saving precious track time and improving race performance.*

## Results

Integrating Exergen sensors transforms pit stop strategy and vehicle performance. Real-time temperature monitoring enables crews to time tire changes perfectly – maximizing track time and competitive advantage. Temperature patterns reveal suspension setup issues before excessive wear occurs, allowing teams to optimize vehicle dynamics for each track. The rugged sensors survive race after race without maintenance or replacement, reducing operational costs while ensuring reliable data capture. Teams gain confidence making critical decisions based on

accurate temperature readings that directly impact race outcomes and championship standings.

## Conclusion

Competitive racing demands precise tire temperature monitoring to optimize performance and pit stop timing. Exergen infrared sensors provide the speed, accuracy and ruggedness needed to deliver reliable data in harsh racing environments. Their compact size, self-powered operation and exceptional reliability make them ideal for on-board data acquisition where every second counts.