Monitoring Theme Park and Amusement Rides

using LGR-5329 Data Logger

Introduction

In 2007, the International Association of Amusement Parks and Attractions estimated that more than 31 million people attended approximately 400 theme parks in the United States.[1] While there is still a place for gondolas and ferris wheels, today's theme parks must re-invent the thrill factor with new and innovative rides to maintain and increase park attendance.

"We use the LGR-5329 to keep the rides up and running, maintaining the revenue stream, efficiency and most importantly public safety."

Design engineers create complex kinematic designs to push thrill seekers to the limits with the use of sophisticated dedicated control systems. However, once the rides are launched, the golden displacement, velocity and acceleration signatures must be monitored and maintained to ensure passenger safety and adherence to regulatory guidelines.

One of the world's largest amusement park organizations is using the LGR-5329 data acquisition logger to validate design signatures and to capture comprehensive data for predictive maintenance on their passenger carriers.

Challenge

A large amusement park created a new and updated attraction that was, "designed to duplicate a cartoon experience, only at high speed and with lots of screaming."

The operator needed a solution to monitor performance for this and other attractions. By collecting and analyzing parametric data points for the slightest fluctuations, as part of a predictive maintenance strategy, passenger safety and regulatory guidelines can be assured.

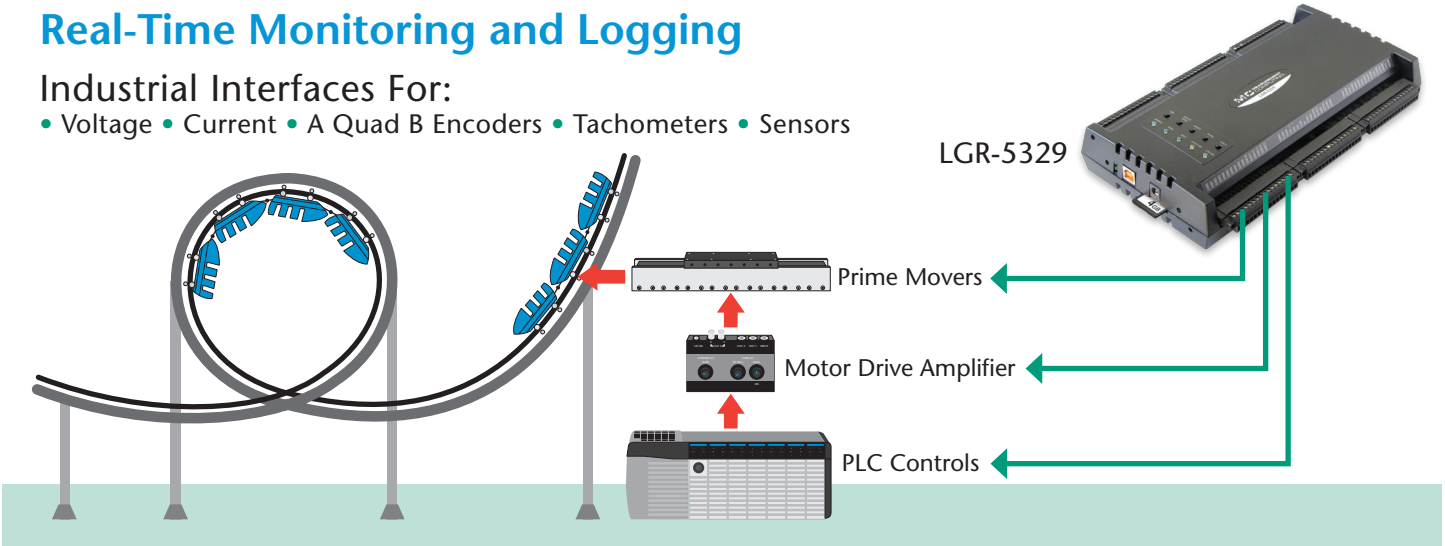
A robust, flexible, monitoring system is needed to ensure adherence to design specs, confirm safety and and prevent costly operational shutdowns. These monitoring systems must offer a rich feature set that allows interfacing to existing industrial signal protocols. The features needed include:

- High-speed analog and digital inputs
- Extended voltage input ranges (±30 V analog, 30 V digital)
- Quadrature encoder inputs
- Internal and external triggering, retriggering, and pattern recognition
- Change-in-state and event logging
- Relay output for alarming

Real-Time Monitoring and Logging

Industrial Interfaces For:

• Voltage • Current • A Quad B Encoders • Tachometers • Sensors



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Solution

The Measurement Computing LGR-5329 data acquisition logger was selected to perform high-speed portable data capture. The stand-alone product synchronously acquires high-speed analog and digital measurements up to 200 kS/s, directly to a Secure Digital (SD) memory card independent of a Programmable Logic Controller's (PLC) operational performance. The LGR-5329 is connected through standard industrial protocols to PLCs, both stationary and on-board, which control the thrill rides. The device is programmed with simple, easy-to-use DAQLog™ software and operates in standalone environments without being connected to a computer.

The advanced triggering options of the LGR-5329 data acquisition logger allow selective acquisition of data. This data, once collected, is analyzed to identify and troubleshoot intermittent issues with subsystems such as compressor controls, air supplies, GFI power supplies, position locators and motor controls.

Summary

The goal of the organization is to "keep the rides up and running, maintaining the revenue stream, efficiency, and most importantly public safety." The LGR-5329 was chosen to monitor the rides because of its small footprint, flexible integration into over a dozen rides, optoisolation, and high-speed data capture that is provided at one tenth the cost of other commercially available loggers.

Product used in this application:

HIGH-SPEED, STAND-ALONE DATA LOGGERS

LGR-5320 Series

- 16 analog inputs, 16 digital I/O, and 4 counters
- Up to 200 kS/s sampling
- Advanced multi-channel triggering
- Easy-to-use DAQLog™ software included
- Supports up to 32 GB SD memory cards

References

1 As published in U.S. Amusement Park Attendance & Revenue History, in 2007 an estimated 341 million people attended approximately 400 parks and attractions in the United States, www.iaapa.org/pressroom/Amusement_Park_Attendance_Revenue_History.asp, accessed March 9, 2009, citing Amusement Business, Harrison Price Company, Economics Research Associates, TEA/ERA Global Theme Park Attendance Report, U.S. Census Bureau, PricewaterhouseCoopers, and International Association of Amusement Parks and Attractions as sources of these numbers.