

Automotive, Transportation / Manufacturing, Production Lines, QA, Testing

## Test the Temperature Distribution of a Radiator

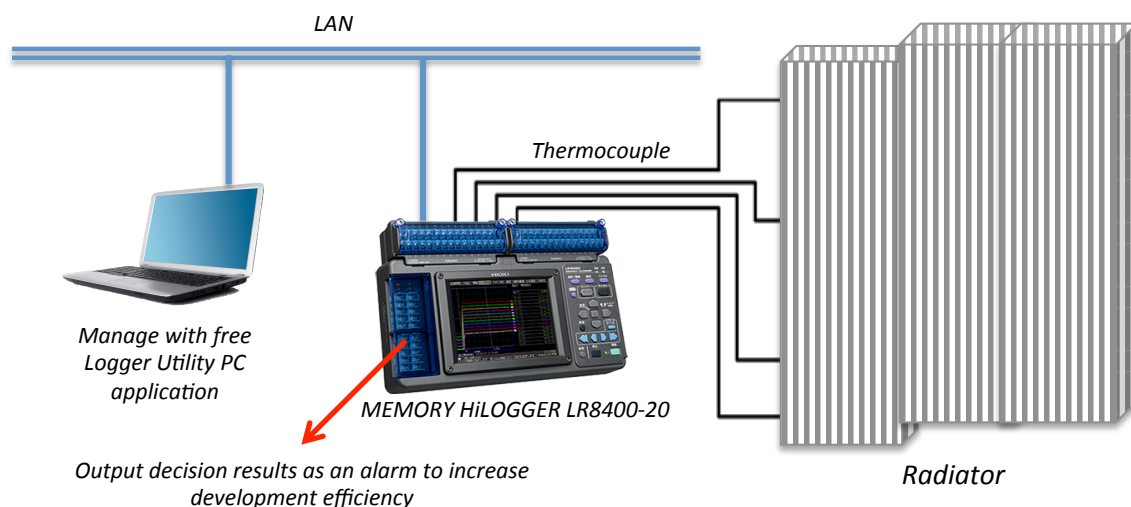
Use HIOKI data loggers to test the temperature distribution on the surface of a radiator that cools the train motor

Locomotive motors can generate tremendous amounts of heat when a train is in operation, and when the heat is not dissipated or managed, it can damage engine parts and/or reduce their lifespan. Just like in motor vehicles, a train's engine compartment must also include an effective radiator system that keeps the surrounding equipment at their optimum operating temperatures by cooling the air, water and oil used in the various operating processes. As such, during train engine development, one of the most important steps is to verify the radiator's mechanical durability with respect thermal shock by measuring temperature distribution.

Hioki's multi-channel data loggers are an effective and convenient solution for measuring the temperature distribution across various points of a radiator as a tool towards determining the optimal cooling liquid temperatures or flow rate and predict the location of possible cracks.

### ■ Highlights

- Measure the specific temperature at various points as well as internally calculate the temperature differences between points in real time. Uneven distribution of temperature in a radiator can lead to sectional heat strains which can cause thermal fatigue, resulting in deformation or cracks. The loggers provide a graphic representation and log all waveforms.
- Output decision results as an alarm to easily determine the pass/fail of equipment based on the defined criteria of temperature difference.
- Use the Hioki Heat Flow Logger LR8432 and heat flow sensors to conduct advanced analysis of heat inflow and outflow to determine the source of heat.



In the above example, the temperature differences between 2 sets of measurement points are measured and the captured data and decision results are transferred to the Memory HiLogger via LAN. The Logger Utility application converts the data to CSV format, which can be pasted automatically into a user-created report and printed for data management and control.



### Products used

- |                             |                                   |
|-----------------------------|-----------------------------------|
| • MEMORY HiLOGGER LR8400-20 | • HEAT FLOW LOGGER LR8432-20      |
| • MEMORY HiLOGGER LR8401-20 | • HEAT FLOW SENSOR Z2012 to Z2019 |
| • MEMORY HiLOGGER LR8402-20 |                                   |

Customer must provide his own thermocouples.