



TECH NOTE

LOCI PRODUCT COMPARISON: LOCI CONTROLLER AND GUARDIAN

The Controller and the Guardian are both vacuum riser mounted products that are part of Loci's automated landfill gas collection system. They share similar features and functionality but differ in the accuracy of the gas composition measurements, and their intended use. The Controller is designed for the more productive wells (>15 scfm) at LFG to high BTU projects, where the highest precision gas composition measurements add the most value. The Guardian is recommended for LFG to high BTU projects on lower flow, less valuable collectors (less than 15 scfm), or for electricity sites or applications where odor control is the operating objective.

Both units measure differential pressure, flow, landfill gas temperature, barometric pressure, CH₄, CO₂, O₂, and balance gas concentrations (calculated; N₂ and trace gases). Both the Controller and Guardian include a remotely controlled precision ball valve that regulates flow using Loci Controls' automated gas collection control algorithms. Valve adjustments are made using measurement data from each collector, as well as aggregate landfill gas composition and flow.

The Controller uses three individual gas composition sensors to independently measure CH₄, CO₂, O₂ concentrations; in contrast, the Guardian uses a dual CH₄ and CO₂ sensor, along with a dedicated O₂ sensor. The Controller gas composition sensor package allows for each sensor to measure just one gas composition, which provides the highest accuracy possible for landfill gas composition measurement at the wellhead. The Guardian uses a dual CO₂/CH₄ sensor, and a standalone O₂ sensor, similar to what is used in a handheld gas analyzer, and are chosen for both performance and cost.

The three individually optimized sensors in the Controller yield an accuracy in the Controller unit that approaches the performance of a gas chromatograph (an expensive laboratory style instrument designed for a controlled environment but often modified by high BTU operators for portable readings or installed at the plant). The Guardian accuracy is comparable to the accuracy of a handheld gas analyzer device.

To enhance the accuracy of the composition readings, Loci heats the sample chamber in both Controllers and Guardians to a constant temperature that is higher than the temperature of the landfill gas. This eliminates condensation on the sensors which can introduce errors in gas composition readings. In addition, Loci maintains a constant pressure during the sample cycle which also improves the accuracy of the measurements relative to a handheld gas analyzer.

WHY LOCI CONTROLS?

With financial, operational, environmental, health, and safety benefits, Loci Controls' products and services help optimize facility management and gas collection for operators and landfill owners alike.



INCREASE REVENUE

- Maximize methane flow
- Control N₂ in the wellfield
- Automated valve adjustments
- Better collection system efficiency
- Reduce plant downtime



INCREASE PRODUCTIVITY

- For both plant and employees
- Lower labor costs for wellfield tuning and O&M
- Reduce plant maintenance costs



REDUCE ENVIRONMENT HEALTH & SAFETY RISKS

- Reduce man hours spent in wellfield
- Reduce fugitive gas emissions
- Reduce odors



This same temperature and pressure is also used during the calibration process. Both the Loci Controller and Guardian include a NIST traceable calibration gas. To maintain higher precision over time, the Controller uses a more frequent standard calibration routine than the Guardian.

Errors resulting from variations in temperature and pressure, as well as errors due to condensation, are eliminated in all Loci products, providing a significant performance improvement over industry standard handheld gas analyzers.

The net result is that the performance of the Controller is twice the accuracy of the Guardian, and is comparable to gas chromatography accuracy. The more economical Guardian has an accuracy that outperforms that of a handheld gas analyzer.

The Loci Sentry uses the same sensor system as the Controller and has the same accuracy and performance, but is used for header monitoring applications. The Sentry can also be used for telemetry from plant data with integrations to a plant gas chromatograph or aggregate landfill gas flow meter. This enables measurement of aggregate flow and composition by laboratory equipment at the plant. This aggregate data is integrated into Loci’s automated gas collection Threshold Gas Composition algorithm.

Full specs are below:

	Controller	Guardian
	Vacuum Riser-Mounted	Vacuum Riser-Mounted
	<i>Used on collection wells at high BTU projects with 15 scfm LFG flow or more</i>	<i>Used on collection wells at high BTU projects with less than 15 scfm flow, for wells on electricity sites, or for odor control</i>
Features		
Measures Gas Composition (CH ₄ , CO ₂ , O ₂ , Balance Gas), Pressure, Temperature	✓	✓
Measures Flow	✓	✓
LFG automation with actuated valve adjustments	✓	✓
Accuracy (% by vol)		
	Calibrated Weekly	Calibrated Monthly
CH ₄	±0.5%	±1%
CO ₂	±0.5%	±1%
O ₂	±0.25%	±0.5%
Balance Gas (calculated)	±1.25%	±2.5%

