Airvac
Vacuum Technology Solutions

Wireless Monitoring

Proactively operate and maintain your vacuum sewer collection system.

Making a difference **today**, for a better **tomorrow**.

Airvac's wireless monitoring system tracks trends, providing operators the ability to proactively operate and maintain your vacuum sewer collection system.

Airvac's Wireless Monitoring with our patented S.M.A.R.T. Technology

(Strategic Monitoring for Advanced Remote Transfer)

Proactively operate and maintain your system.

Airvac's wireless monitoring system, with our patented S.M.A.R.T. technology, can track trends and identify any abnormal conditions as soon as they occur. The data received from LoRa modules can be used to adjust the system, making certain that it continues to run at peak performance levels. If an issue occurs along the vacuum main or at a valve pit, the monitoring system will pinpoint the exact location and identify any necessary adjustments that need to be made. Airvac's system will monitor vacuum levels, valve status, high sump level, system trends, cycles, cycle time, and any instances of infiltration.

Our system not only monitors itself, but it also automatically makes real-time adjustments to optimize system hydraulics. This proactive approach of controlling a vacuum system's behavior results in optimum system performance, prevents problems from occurring, and reduces operation and maintenance costs.

Benefits

- **Predictive and proactive:** Potential problems are not only identified, adjustments are automatically made to correct them.
- **More efficient system:** System imbalances can easily be overcome, resulting in a more cost-effective system.
- **Airvac is connected 24/7:** Airvac specialists can monitor the system in real-time, providing assistance to the operator.
- **Built-in purge cycle:** A "purge" cycle can be programmed into the logic controller that will automatically clear the vacuum mains at programmed times to prepare for potential high flow events.
- **Automatic system updates:** Airvac can remotely push programming updates to keep S.M.A.R.T. current.

Key Wireless Monitoring Features

S.M.A.R.T. Technology

Airvac's patented S.M.A.R.T. technology works in conjunction with the monitoring system. It proactively makes real-time adjustments, prevents problems from occurring, and it reduces operation & maintenance costs.

Using artificial intelligence (AI), S.M.A.R.T. communicates with the various vacuum station controls and will override pump control as necessary. S.M.A.R.T. software uses several modes to identify system imbalances and to provide recovery options. This may include monitoring various system vacuum levels, monitoring pump operating parameters, monitoring incoming flows, actuating remote vacuum valves, and adjusting vacuum levels at the station.

Dedicated Ports

Dedicated ports are integrated into the vacuum valve and sump breather, which makes connecting monitoring cables quick and easy.

No Magnets or Floats Required

Our vacuum valve monitoring does not require a magnet with newer model vacuum valves, minimizing the risk of failure due to misalignment, switch malfunction, or debris build-up. Sump levels are monitored through our new diaphragm breather instead of using a float. This minimizes the chance of failure due to the float getting stuck or hung up on internal wiring. (floats are still available for older systems)

Two-Way Communication

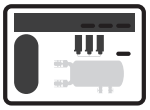
Two-way communication offers operators the ability to remotely cycle specific S.M.A.R.T. vacuum valves.

Monitoring Features Side-by-Side Comparison

	Airvac	Industry Standard
System Connections		
LoRa Modules	✓	✓
Cloud Data Storage	✓	✓
SCADA Connectivity	✓	✓
Main Gateways	✓	✓
Remote Gateways	✓	✓
Magnet Activated Sensors	✓	✓
Sump Float	✓	✓
Vacuum Station Control Panels	✓	✓
Types of Reporting		
Vacuum Levels	✓	✓
Valve Status	✓	✓
Sump Level High	✓	✓
System Trends	✓	✓
Cycles, Cycle Time	✓	✓
Infiltration	✓	✓
Latest Technology		
Dedicated Ports	✓	
Modulation	✓	
S.M.A.R.T. Technology	✓	
Two-Way Communication	✓	✓
Interactive e-Cabinets	✓	
No Magnets or Floats Required	✓	

Key Wireless Monitoring Components

Station Monitoring



The benefits of station monitoring:

- Allows remote viewing of station status, vacuum level history, and pump operation trend graphs. These are very valuable to keep your system running at its best, and to know when problems begin.
- Allows comparison of end of line vacuum to station vacuum to diagnose vacuum main water logging.
- If backups start to occur you need to know vacuum levels on the system. All of this is viewable remotely.
- All incoming I/O, like vacuum level, tank level, pump status, and alarms can be monitored if desired.
- You will have access from any mobile device with an internet connection.

Modules

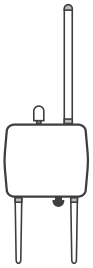
"Modules" collect data from the vacuum valves and breathers and transmits the collected data, via LoRa, to the "Main Gateway". "Modules" operate at 7.2 volts (battery) and can be customized to handle many different I/O's. The 'Modules' are IP68 and can be installed inside or outside the valve pit.

Battery

Airvac modules use Lithium thionyl chloride batteries (Li/SOCl2). These batteries have a long life expectancy, and they are designed for use in temperatures ranging from -76° to 185° Fahrenheit or -60° to +85° Celsius. The modules also have special built-in features to further extend battery life.

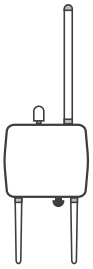
These batteries have a 20-year shelf-life. With the recommended Airvac data transfer frequency, 3 to 5 years battery life is expected. Battery life depends on the frequency of the data transfer.

Main Gateway

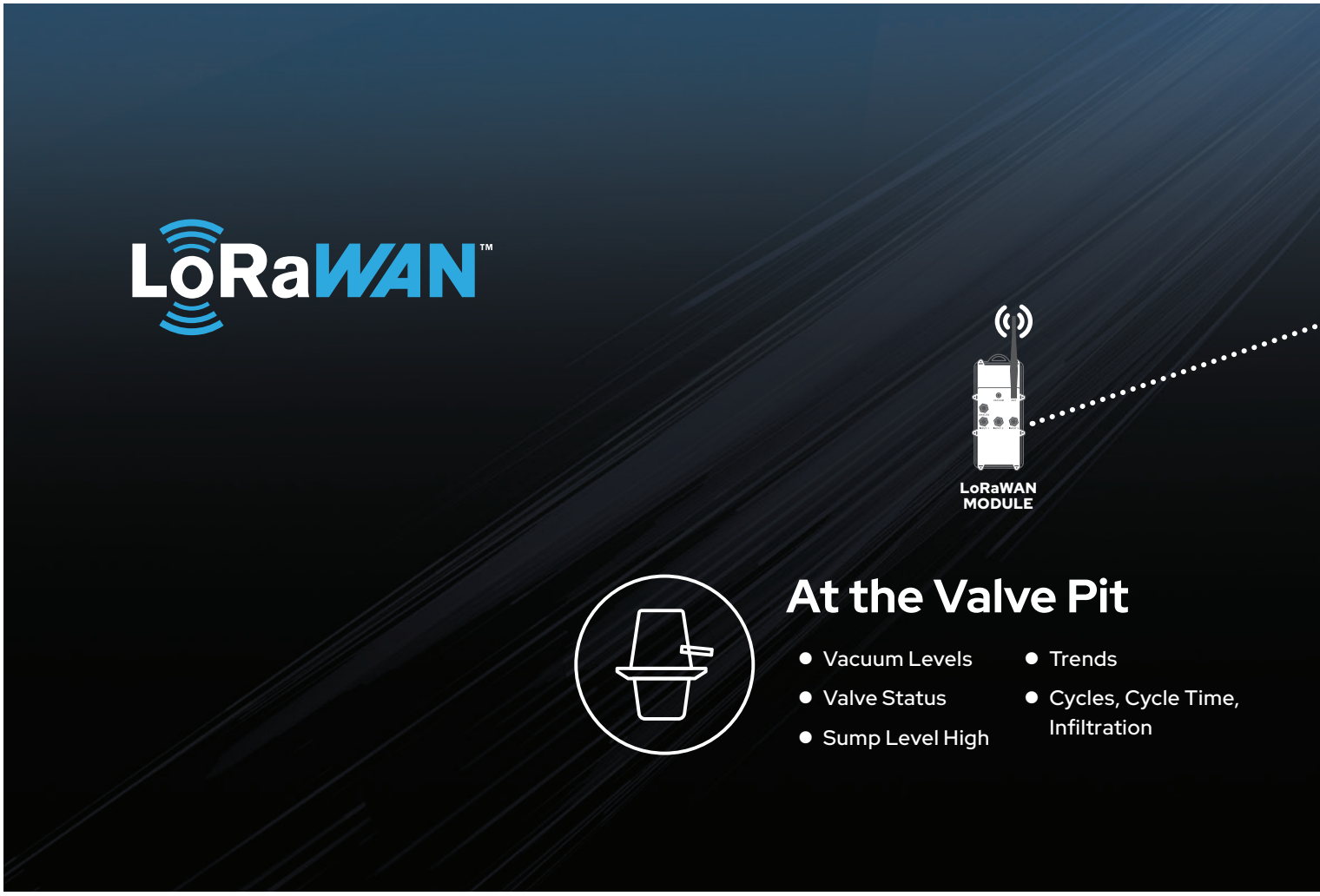


Our "Main Gateway" communicates with the "Modules" in the field. All information received from the "Modules" is transferred to the control server. This can be done with GPRS/GSM or by wired LAN. The best spot to install a "Main Gateway" is in the middle of the development area, or at the highest point. The "Main Gateway" needs power (100-240VAC-1A) and an ethernet connection, if you're not using the GSM function. In large areas, or areas with tall trees and buildings, there can be multiple "Remote Gateways" installed to cover the entire area.

Remote Gateways



Our "Remote Gateways" communicate with the "Main Gateway". The "Remote Gateways" always need at least one "Main Gateway" in the system. The main advantage of using "Remote Gateways" is to deliver better signal coverage to the "Modules", which helps to conserve their battery life. It also reduces installation time, avoiding the need for site surveys in the field.

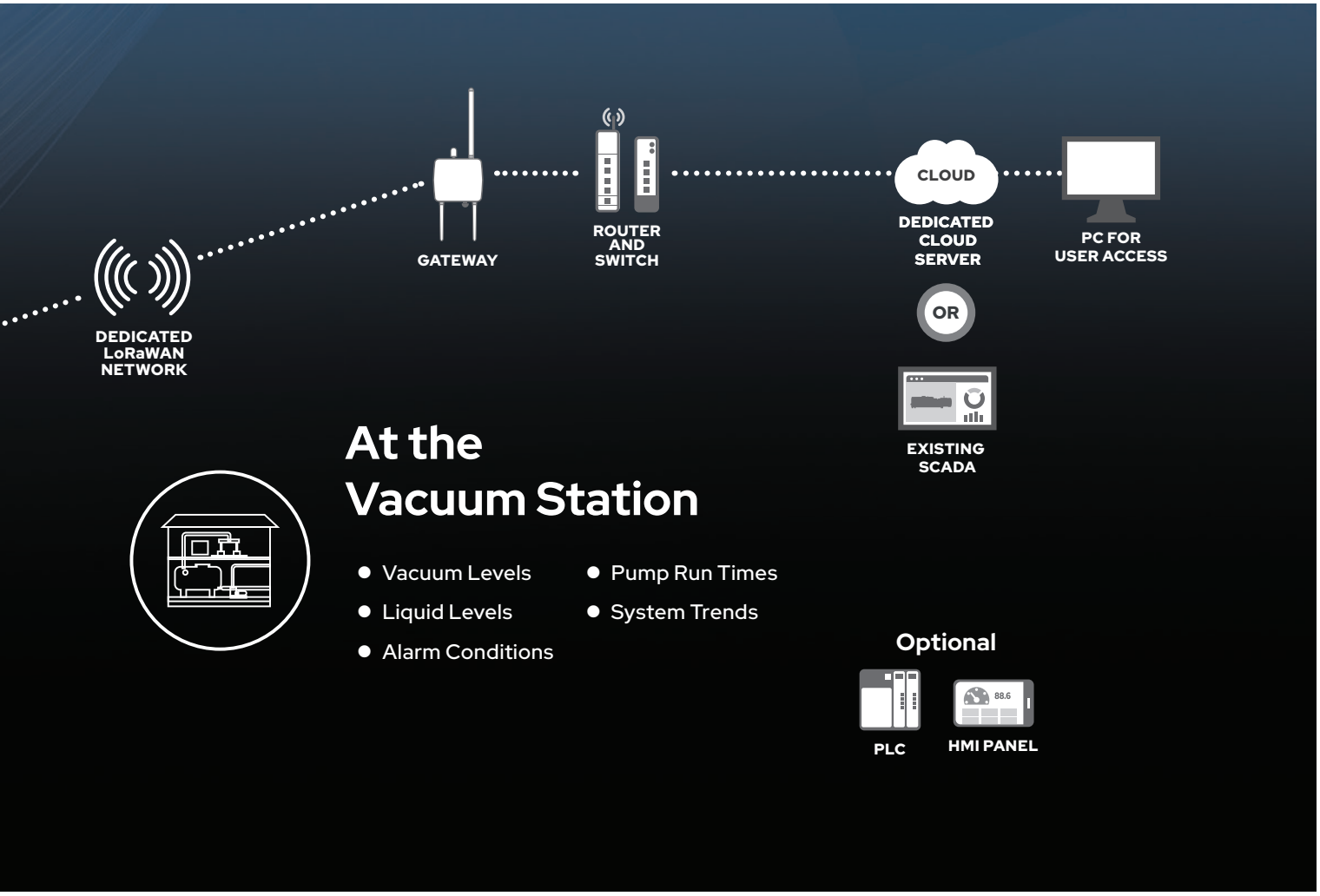


How It Works

Within the valve pit a factory assembled and tested wiring harness is installed and easily connects the Airvac interface valve to the radio transmitter. The wiring harness is connected via a cable to the wireless radio unit which is housed in the Airvac Air Terminal or in a utility box next to the valve pit. The radio unit is programmed to monitor valve opening and closing operation, as well as high liquid level in the holding sump. Each of these signals are collected by the radio unit and are transmitted at set intervals to the main computer at the vacuum station.

Radio LoRa communication uses a low power line of sight radio transmission between each wireless unit and the area gateway. The pit radios used are the latest design, longest range, lowest power consumption models available. Typical radio communication is up to 2 miles from a gateway and multiple remote gateways are used for remote areas, or to provide more reliable or redundant service.

At one vacuum station on the project site is a panel with a Remote Terminal Unit which collects all the data for the project. This system logs all data and includes a web server for remote access. An internet connection with a secure router connects to this computer, providing remote browser view of system operations from a computer, ipad, or phone.



What Is LoRa?

LoRa is the existing wireless platform of the Internet of Things (IoT). LoRa chipsets connect sensors to the Cloud and enable real-time communication of data and analytics. LoRa devices enable smart IoT applications that solve some of the biggest challenges facing our planet: energy management, natural resource reduction, pollution control, and infrastructure efficiency.

What Is LoRaWAN?

LoRaWAN is low-power, wide area networking (LPWAN). It leverages the unlicensed radio spectrum in the Industrial, Scientific, and Medical (ISM) band. The LoRa Alliance®, a nonprofit association and fast growing technology alliance, drives the standardization and global harmonization of the LoRaWAN standard.

With the Airvac LoRa monitoring system, numerous battery-powered “things” can be connected to a single, dedicated LoRaWAN network. It can facilitate data collection from energy meters, street lighting, parking sensors, condition monitoring equipment, air quality stations, waste and recycling containers, storm drains, asset monitoring and much, much more.

LoRaWAN provides secure, bi-directional, low-power, long-range communication. The LoRaWAN data can be incorporated into existing city systems. It can send notifications, create reports, activate processes, alert people, or trigger other automated actions.

Vacuum Technology Solutions

Making a difference **today**, for a better **tomorrow**.

Sustainable & Efficient

Our vacuum technology reduces water consumption, minimizes infrastructure costs, and supports environmentally responsible solutions across all industries.

Flexible & Scalable

Designed to adapt to diverse environments, our systems integrate seamlessly into new and existing projects, whether for municipal sewer networks, large-scale sanitation facilities, or railway infrastructure.

Hygienic & Reliable

Our sealed vacuum systems prevent leaks, odors, and contamination while offering easy maintenance and long-term reliability, ensuring uninterrupted performance in any application.

Innovative & Proven

With decades of expertise and patented industry-firsts, we continuously advance vacuum technology to deliver smarter, more reliable, and cost-effective solutions worldwide.

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We provide FREE cost estimates & system layouts.

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