

HLR 14M Indoor Module

Air Scrubbing Solution



HVAC Load Reduction Module

Implementing ASHRAE 62.1 Indoor Air Quality Procedure (IAQP) with the HLR 14M reduces first costs and operating costs for new and existing HVAC systems, lowers a building's carbon footprint, and improves indoor air quality while also generating LEED and WELL building credits. The HLR module scrubs the air in buildings so that outside air can be reduced without compromising indoor air quality and by reducing the infiltration of outdoor pollutants. The reduction of required outside air allows for HVAC system downsizing and less energy load on HVAC systems. This solution is compliant under ASHRAE 62.1 and IMC 403.2. The HLR 14M Module is designed for indoor use. The HLR 15R Module (not shown) is an outdoor model designed for rooftop installations.



**HLR 14M
Indoor
Module**

HLR Technology®

HLR technology represents a vital addition to conventional HVAC systems to reduce the heating and cooling load of outside air. enVerid's molecular air cleaning technology removes contaminants from indoor air, thereby decreasing the required volume of outside air ventilation while providing the most cost-effective, safe and reliable solution for indoor air quality.

enVerid Cloud™

The HLR 14M Indoor Module supports IoT connectivity and is linked to the enVerid Cloud using a secure cellular connection. End-to-end encryption and system hardening provide additional layers of security. Facility managers and engineers have 24/7 access to a dashboard with IAQ measurements with a secure login to the enVerid Cloud, HLR module status and the energy savings.

ASHRAE Standard Compliance

62.1

The HLR 14M Indoor Module is compliant with ASHRAE 62.1 Indoor Air Quality Procedure (IAQP), the preferred approach to achieve energy efficiency and indoor air quality (IAQ). Introduced in 1981, IAQP is a performance-based design procedure that determines outdoor air intake rates based on an analysis of contaminant sources and air cleaning capacity to stay below recommended contaminant concentration limits.

The ASHRAE 62.1 Standard recognizes that "The IAQP may allow for a more cost-effective solution to providing good air quality." Additionally, "The IAQP may also be used to achieve better air quality than VRP."

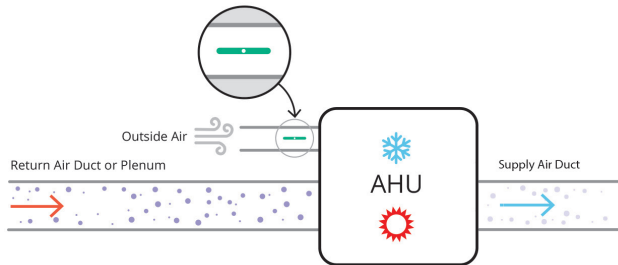
145.2

The cleaning efficiency for HLR modules was tested by a third-party lab in accordance with ASHRAE Standard 145.2 – Laboratory Test Method for Assessing the Performance of Air-Cleaning Systems.

How it Works

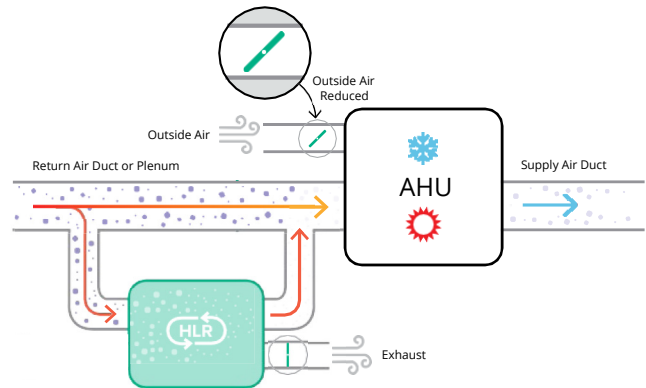
The diagram below illustrates the HVAC operation using ventilation only and ventilation and scrubbing.

Ventilation Only



The outside airflow based on ASHRAE 62.1 Ventilation Rate Procedure (VRP).

Ventilation and Scrubbing



Outside airflow decreased using ASHRAE Standard 62.1 IAQP¹ calculations and maintaining positive building pressure.

HLR 14M Indoor Module Has Four Integrated Capabilities



Indoor Air Scrubbing (Adsorption Mode)

A fraction of the return air stream is directed through the HLR 14M Module to remove indoor-generated contaminants using a blend of sorbents that capture carbon dioxide (CO₂) along with a wide range of volatile organic compounds (VOCs), aldehydes, ozone, acids and particulate matter (PM_{2.5}) resulting in cleaned air that flows back into circulation.



Outside Air Intake Reduction

Outside air reduction leads to lower cooling and heating energy consumption² and reduces the intake of outdoor-generated pollutants. By following ASHRAE Standard 62.1 IAQP, HLR Technology enables significant outside air reduction relative to the typically prescribed amounts, while maintaining indoor air quality.



Automatic Self-Cleaning (Regeneration Mode)

The sorbents are designed to release captured contaminants upon heating. The HLR 14M Module is equipped with a built-in heater and performs a periodic regeneration process to clean the sorbents and expel contaminants outside the building. Regeneration is managed for optimal performance and minimal energy use.



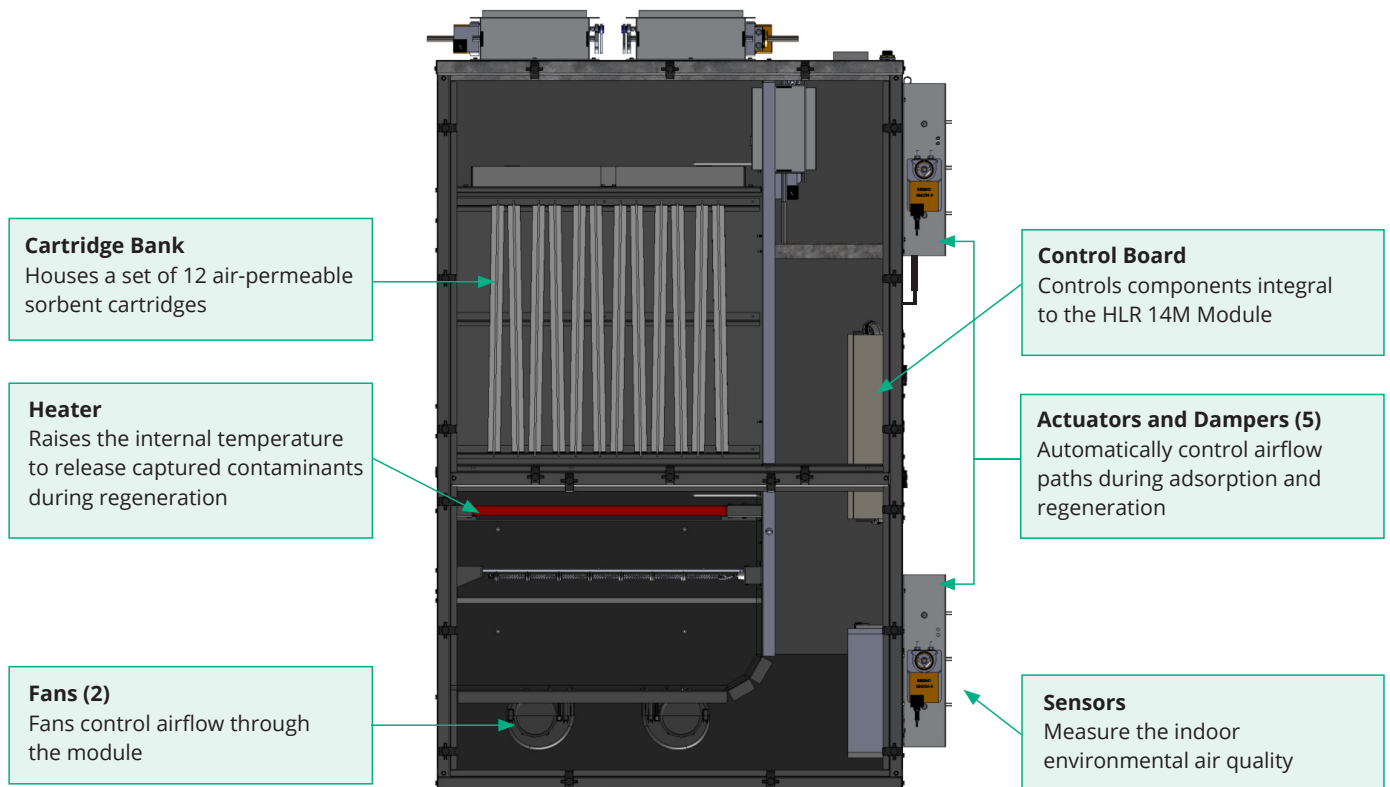
Monitoring and Reporting

HLR software communicates continuously with the onboard sensors to record, report and optimize all aspects of the HLR module's operation. The system provides secure, real-time reporting of IAQ and operating parameters to the enVerid Cloud™.

¹ The mass balance analysis is performed per contaminant and per zone to ensure all contaminants are properly below their established limits. These "per zone" outside air CFMs are summed to yield the total ventilation required for the building. enVerid's IAQP calculator makes it easy.

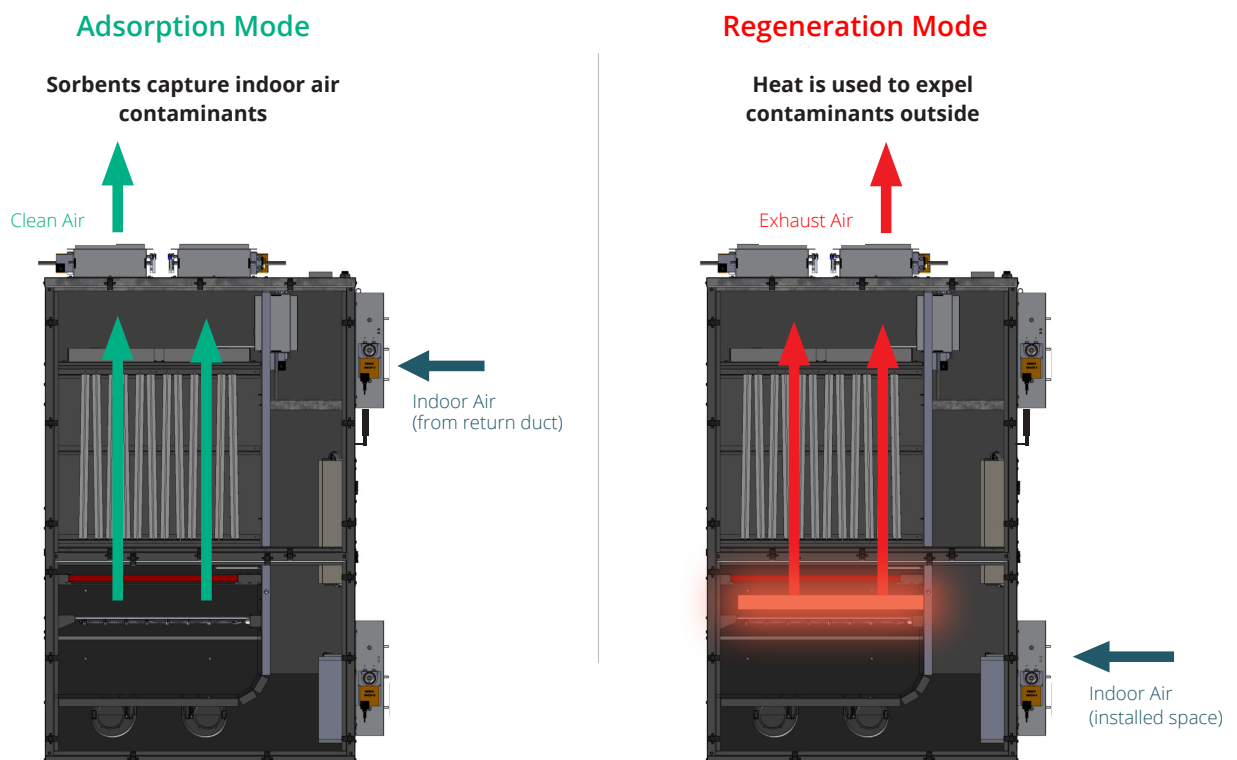
² When economizer operation is favorable, outside air is increased and the HLR module is in standby.

What's Inside the HLR 14M Indoor Module?



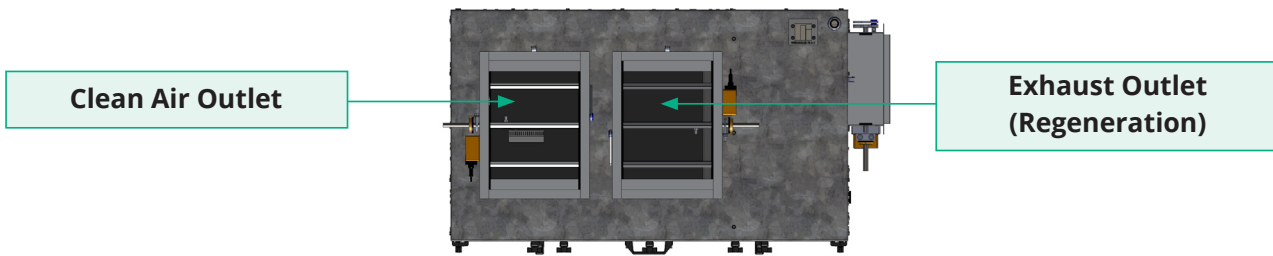
HLR 14M Indoor Module Adsorption and Regeneration Modes

The diagrams below depict the “under-the-hood” view of HLR 14M Module operation during adsorption and regeneration modes.

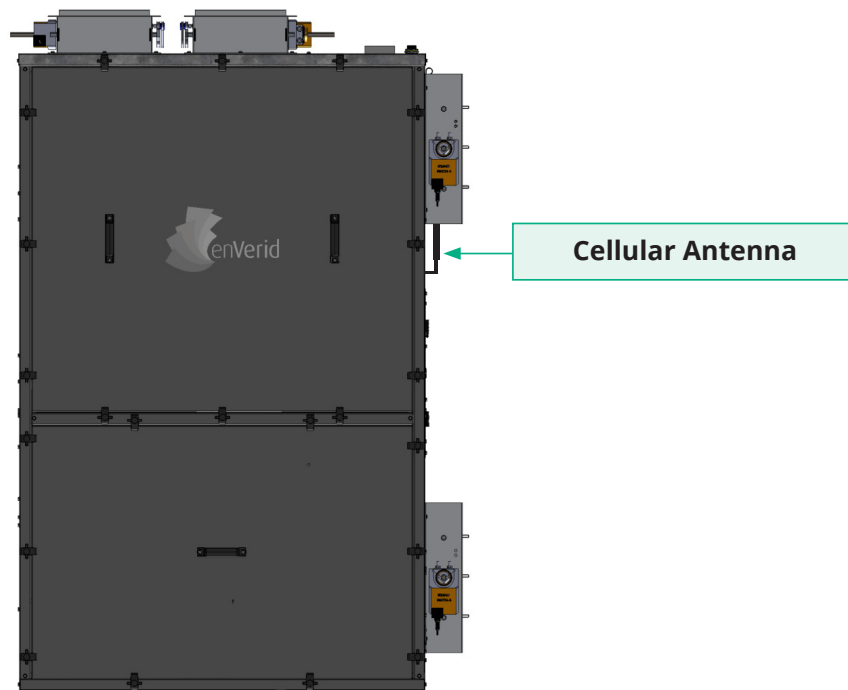


HLR 14M Indoor Module Drawings

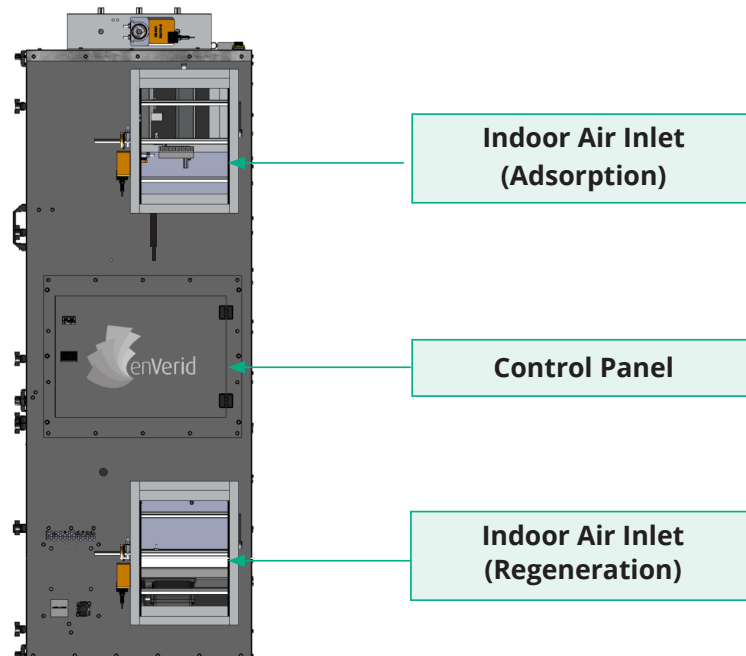
TOP VIEW



FRONT VIEW



SIDE VIEW



14M Indoor Module Specifications

GENERAL SPECS

| | | | |
|--|--|---------------|--|
| Installation | Mechanical Room or Air Plenum | | |
| Construction | Single wall, Insulated, Powder-coated Galvanized Steel | | |
| Sorbent Cartridges per Set | 12 | | |
| Typical Airflow (Adsorption) CMH | 850 - 950 SCFM | 1,444 - 1,615 | |
| Typical Airflow (Regeneration) | 150 - 250 SCFM | 255 - 425 CMH | |
| Static pressure added to AHU fan | None | | |
| Sound Power Level | 55 dB | | |
| Maximum Allowed External Static Pressure | 0.3" WG / 75 Pa | | |
| Maintenance | Annual | | |
| Operating Life | 20+ years with scheduled maintenance | | |

COMMUNICATIONS

| | |
|-----------------|------------------------------|
| Cellular Link | 3G / 4G |
| BMS Integration | BACnet over MSTP or Hardwire |

SYSTEM POWER RATINGS

| Voltage (VAC) | Frequency (Hz) | MCA | MOCF |
|---------------|----------------|-----------|--------|
| 208 V | 60 Hz | 38.05 Amp | 40 Amp |
| 277 V | 60 Hz | 34.33 Amp | 40 Amp |
| 220-240V | 50-60 Hz | 36.52 Amp | 40 Amp |

POWER CONSUMPTION

| | 208 V | 277 V | 230 V |
|--------|---------|---------|---------|
| Heater | 5,500 W | 6,500 W | 5,800 W |

REQUIRED CONTROL CONNECTIONS

| | |
|------------|----------------------------|
| Start/Stop | Binary Input to HLR Module |
|------------|----------------------------|

OPTIONAL CONNECTIONS

| | |
|-------------------------------------|-------------------------------|
| Fire Signal | Binary Input to HLR Module |
| HLR Status | Analog Output from HLR Module |
| Regeneration Booster Fan Start/Stop | Binary Output from HLR Module |
| Indoor Air CO ₂ Sensor | Analog Output from HLR Module |
| Indoor Air TVOC Sensor | Analog Output from HLR Module |

HLR 14M MODULE WEIGHTS

| | | |
|-------------------------------|---------|--------|
| Module Shipping Weight | 650 lbs | 295 kg |
| Cartridge Shipping Weight | 200 lbs | 91 kg |
| Installation/Operating Weight | 630 lbs | 286 kg |

HLR 14M MODULE DIMENSIONS (Front View)

| | |
|--|---|
| Height (Allow Additional 21" Clearance for Elbow) | 72" / 1,829 mm |
| Width (Allow Additional 36" Clearance for Control Panel Service) | 48" / 1,219 mm |
| Depth (Allow Additional 36" Clearance for Cartridge Service) | 27" / 686 mm |
| Ducts (Indoor Air Inlet and Regeneration Air Inlet) | 10" x 14" w/ 1.0" flange 254 mm x 356 mm w/ 25 mm flange |
| Ducts (Clean Air Outlet and Regeneration Exhaust) | 10" x 14" w/ 1.0" flange 254 mm x 356 mm w/ 25 mm flange |

CERTIFICATIONS

| | |
|-------------------------------|--|
| HLR Module Safety | UL 1995:2015 Ed.5 CSA C22.2#236:2015 ed.5 |
| Cartridge bank and cartridges | UL 900:2015 Ed.8 |
| Air cleaning efficiency | ASHRAE 145.2 |