



INSTALL CONFIDENCE.

EcoAdvance™

HLR1000E

CUSTOMER SPECIFICATION
INFORMATION (CSI)



TABLE OF CONTENTS

1. ACCEPTABLE PRODUCTS.....	3
2. GENERAL DESCRIPTION.....	3
3. STANDARD COMPLIANCE.....	3
4. UNIT CONFIGURATION.....	4
5. UNIT CASING / CABINET.....	4
6. CARTRIDGES.....	5
7. FANS.....	6
8. HEATERS.....	6
9. SHUNT DAMPER.....	7
10. PRE FILTER.....	7
11. VOC FILTER.....	8
12. INSULATION.....	8
13. CONTROLS (BOARD/INTERFACE).....	8
14. SENSORS.....	9
15. DAMPER.....	9
16. MODES OF OPERATION.....	10
17. FANS & HEATERS CONTROLS.....	12
18. AIRFLOW TOPOLOGY.....	13
19. BUILT IN CONNECTIONS.....	13
20. POWER REQUIREMENTS.....	14
21. COMMUNICATIONS.....	14
22. AIRFLOW MONITORING STATIONS.....	15
23. POWER DISCONNECT.....	15
24. MISCELLANEOUS FEATURES.....	15
25. FINISHES.....	16
26. TESTS & INSPECTION.....	16
27. INSTALLATION (REQUIREMENTS & STEPS).....	17
28. CLEANING.....	17

29. PRECAUTION18

30. STARTUP SERVICE AND OWNER TRAINING.....18

31. DOCUMENTATION FOR OWNER.....19

32. MAINTENANCE.....19

33. QUALITY ASSURANCE.....19

CSI for YORK® ECOADVANCE™ 1000E Module

1. ACCEPTABLE PRODUCTS

YORK® ECOADVANCE™ 1000E Module

2. GENERAL DESCRIPTION

- 2.1. Unit(s) is a fully self-contained mechanical design with easy back to back retrofit to existing HVAC infrastructure.
- 2.2. Unit(s) shall be a single piece construction as manufactured at the factory.
- 2.3. Unit(s) shall be furnished and installed as specified on the contract documents and within specifications.
- 2.4. Unit(s) shall conform to design for simple turnkey installation and lightweight footprint for easy transport and positioning.
- 2.5. Unit(s) is an all-season module. It shall be operating using standard single phase power.
- 2.6. Unit(s) is designed to perform the sorption (cleansing) cycle and regeneration (outdoor purge) cycle.
- 2.7. Unit(s) shall consist of cartridges that utilizes Enverid's proprietary technology to capture molecular contaminants to maximize energy efficiency & savings, during sorption (cleansing) cycle.
- 2.8. Unit(s) shall be capable of real-time monitoring.

3. STANDARD COMPLIANCE

- 3.1. Manufacturer shall conform to “ASHRAE 62.1-2013” guidelines for performance by ventilation procedure.
- 3.2. Manufacture shall conform to “ASHRAE 62.1-2013” guidelines specifically for RFI compliance clarified and published in Jan. 2015.
- 3.3. Manufacture shall have LEED certification.

4. UNIT CONFIGURATION

- 4.1. Unit(s) shall be made of a durable finish, sturdy construction, and closed-cell thermal and acoustical insulation, making it compatible with indoor installations.
- 4.2. Unit(s) is to be made of a design which can be installed vertically or horizontally for easy placement anywhere near the AHU, in the building’s mechanical rooms.
- 4.3. Unit shall consist of an insulated casing, access doors, fans, cartridges, motors, motor controls, filters, dampers, controls, components, and accessories; as shown on York EcoAdvance drawings, schedules, and specifications.
- 4.4. Unit(s) shall be designed to handle up to 750 CFM (cubic feet per minute) of air in a slipstream configuration drawn from the return air path of the HVAC system.
- 4.5. Manufacturer shall provide detailed, step-by-step instructions for installation.

5. UNIT CASING / CABINET

- 5.1. Unit(s) shall be made of a single wall construction.
- 5.2. Unit(s) wall shall be manufactured to 20 gauge sheet metal material specification.
- 5.3. Unit(s) shall have four 14" circular duct connections designed to connect T-spiral OR snap-fit hard duct.
- 5.4. Duct connection shall serve as two circular inlets and two circular outlets controlled by dampers.
- 5.5. The inlets shall route the air during sorption properly as required, whereas exhaust outlet shall route the air during the purge portion of the regeneration cycle.
- 5.6. Unit(s) shall conform to UL 1995 & CSA22.2 #236, 4th edition.
- 5.7. Seals used for the unit shall be 1/4" & 1/8" thickness.
- 5.8. The inside walls of unit(s) is to be covered in closed-cell thermal and acoustical insulation material for improved efficiency and soundproofing.
- 5.9. Unit(s) shall have a thermal resistance minimum of R value 1.4.
- 5.10. Unit shall be provided with tool-less door panels. Quarter turn latches and 2 tab latches with finger style handle shall be provided for easy access.
- 5.11. Unit(s) shall completely conform and perform internal field leakage test on assembly line.

6. CARTRIDGES

- 6.1. Unit shall house 12 polypropylene cartridges that contains Enverid proprietary sorbent for air scrubbing process. These cartridges shall have UL900 rating.
- 6.2. Unit(s) shall be able to treat the air for molecular contaminants such as CO₂, formaldehyde, VOCs and PM_{2.5}
- 6.3. Unit(s) shall maintain pressure greater than 160 pa across cartridges bank. The ideal pressure that shall be maintained is 160 pa – 190 pa.

7. FANS

- 7.1. Unit shall be provided with 2 integrated DC brushless fans. These fans control airflow during the sorption and regeneration cycles.
- 7.2. Fans shall be digitally controlled and light weight.
- 7.3. Variable Speed control and active feedback from the fans verifies proper operation.
- 7.4. Fans shall be operate on 24V DC.
- 7.5. The fans are controlled using pulse width modulation for variable speed and are safety listed to S.T.EN60950-1, CSA Std. C22.2 No.113-10 UL507 9th Ed.
- 7.6. Fans shall have UL standard compliance.
- 7.7. Unit(s) shall have fans mounted with hex headed 8-32 bolts into blind fastener.
- 7.8. Mounting arrangement of fan position are not sensitive; it is dependent on the position of the unit.

- 7.9. Unit shall have 4 spring loaded vibration isolation feet, which can be mounted below the unit or placed on optional horizontal mounting kit.

8. HEATERS

- 8.1. Unit(s) shall be provided with integral heaters as the source of heat during regeneration cycle.
- 8.2. Unit(s) shall incorporate heaters with a capacity of 6.5 kW @ 277V and 5.5 kW @ 208V, 220V, 230V and 240V models.
- 8.3. Heaters shall be activated using a PID-controller built into the control board.
- 8.4. External dampers shall be interlocked with the heaters.
- 8.5. The internal damper/Shunt is to be used during the heating portion of the regeneration cycle and shall be controlled to be "open" only when all other external dampers are closed. During this phase, all external dampers are closed, and air is recirculated inside the unit in a closed loop to accelerate the CO₂ and VOC release process from the sorbent.
- 8.6. The heater shall include on board over-temperature protection devices to ensure the system is safe.
- 8.7. Safety mechanisms shall include an air differential pressure switch, a resettable thermal switch, and a one-time blow fuse.

9. SHUNT DAMPER

- 9.1. Unit(s) shall also be provided with internal damper / shunt along with the heaters.
- 9.2. An internal damper / shunt shall be used during the heating portion of the regeneration cycle and shall allow the system to reach and maintain optimal temperature.
- 9.3. During the regeneration cycle, the internal damper / Shunt shall be controlled by an actuator scheme allowing for analog position control to actively control the amount of recirculated air.

10. PRE FILTER

- 10.1. Unit(s) shall be provided with a disposable MERV 8 filter which is used to clean outside air during the regeneration purge cycle.
- 10.2. MERV filters shall be removable by lifting two tabs and replacement size shall conform to 12" x 22" x1".

11. VOC FILTER

- 11.1. Unit(s) shall also be provided with a special VOC filter along with cartridges.
- 11.2. VOC filter size shall be a 20" x 20" x 2" pleated and is UL900 certified.
- 11.3. The VOC filter has a metal frame with gasket and placed above the cartridges.

12. INSULATION

- 12.1. All internal surfaces of the unit shall be covered in closed-cell thermal and acoustical insulation material for improved efficiency and soundproofing.

13. CONTROLS (BOARD/INTERFACE)

- 13.1. Unit shall be provided with both power supply and controller board in an electronic enclosure.
- 13.2. Controller board shall incorporate a power supply that shall convert the AC power to the necessary voltages to operate all aspects of units including actuators, heater, fans and sensors.
- 13.3. Unit shall be provided with wireless communication capabilities for ongoing monitoring and reporting of indoor air quality, sorbent performance, and system operating conditions.
- 13.4. The controller shall contains the systems software, all controls/relays/sensor interfaces, and all wireless and wired communication modules.
- 13.5. For system information communication, cellular link capability shall be 2.5G/3G and wireless link shall be 915 MHz

14. SENSORS

- 14.1. Unit shall have 4 internal sensors and 2 additional external sensors. Sensors shall be able to fulfill the functional requirement as listed below--
- 14.2. Quad type internal multi sensor to measure temperature, relative humidity, Volatile Organic Compounds and CO2 in incoming air.
- 14.3. Internal triple sensor to measure temperature, relative humidity and CO2 in outgoing air.
- 14.4. Internal air differential pressure sensor to measure interior pressure across the cartridge bank

14.5. Internal sorbent temperature sensor to measure temperature difference during regeneration.

14.6. External sensor to measure temperature and relative humidity in supply air duct and outdoor air duct shall be provided with the unit.

15. DAMPER

15.1. Unit outlets shall be provided with dampers for airflow control.

15.2. Outside air damper shall be provided with actuator for load management.

15.3. Unit shall have the provision of outside air damper position monitoring.

15.4. Outside air damper controlling shall operate on signal 2 – 10V DC.

15.5. Outside air damper open and close signal shall be interlinked with the building automation system.

15.6. Unit(s) shall have electromechanical control of the HVAC system's outside air damper minimizing the amount of outside air ventilation based on energy and air quality considerations.

16. MODES OF OPERATION

Unit shall be designed to actively and automatically manage HVAC load and IAQ (Indoor Air Quality), by performing the following operational modes –

- A. Sorption Mode
- B. Regeneration Mode
- C. Standby Mode
- D. Fire / Emergency Mode
- E. Air Handler Mode

16.1. Sorption Mode:

- 16.1.1. Unit shall house cartridges patented sorbents by Enverid Systems to eliminate carbon dioxide, formaldehyde and Volatile Organic Compounds (VOCs).
- 16.1.2. Unit shall be provided with embedded sensors for continuous monitoring indoor air quality, sorbent performance and system operating conditions to ensure optimal IAQ management as per requirement in the building.
- 16.1.3. The air entering the unit through the inlet opening shall be directed by fans over the cartridges. Manufacturer shall ensure that air travels through the sorbents housed in the cartridge set for air to be cleansed.
- 16.1.4. Cartridges with patented sorbents shall capture contaminants (CO₂, formaldehyde, VOCs and PM_{2.5}) from the air, thereby performing sorption (cleansing) cycle.

16.2. Regeneration (Out purge) Mode:

- 16.2.1. Unit shall be provided with integral sensors monitoring the saturation of sorbent. This could be a time based regeneration or a manual regeneration managed via a SCADA platform.
- 16.2.2. Based on a time based or manual trigger, sorbent unit shall launch a regeneration process during which the sorbents release the captured contaminants through the exhaust of the building. Regeneration shall be scheduled, managed and timed for automatic performance and minimal energy use.

16.3. Standby Mode:

When not in an active mode, unit(s) shall not carry any air flow, but shall continue to monitor via the air quality sensors.

16.4. Fire/Emergency:

- 16.4.1. Unit shall have an inbuilt automatic fail-safe setting in case of fire emergency, power outage or malfunction.
- 16.4.2. Unit(s) shall be able to perform the smoke / fire mode operation in case of fire event to avoid smoke spreading throughout the building through the air ducts.

16.5. Air Handler Mode:

The unit(s) shall operate normally in conjunction with the AHU.

17. FANS & HEATERS CONTROLS

- 17.1. Pulse width modulation with active speed feedback shall be used to control the speed of the fans for optimal airflow during all modes of operation.
- 17.2. The fans shall contain an on-board locked rotor protection to protect the unit from any damage.
- 17.3. The heater shall be controlled using a PID controller loop to maintain the internal temperature. The temperature control (to control the heater) shall have safety built in via both software functionality and mechanical shut offs.
 - 17.3.1. An air differential pressure switch shall ensure that the heater is disabled when there is insufficient airflow inside the unit.
 - 17.3.2. A resettable thermal switch shall disconnect the heater when the temperature exceeds a preset limit and will only allow the heaters to operate once a safe temperature has been reached.
 - 17.3.3. A one-time blow fuse shall permanently disconnect the heater in the event the two primary safety functions fail to work.

18. AIRFLOW TOPOLOGY

- 18.1. Unit(s) should be able to be installed in either a plenum-return method or a ducted-return method.
- 18.2. For a plenum-return, inlet and outlet of the units are to be properly connected to the respective air sources.
- 18.3. For a ducted-return, unit shall follow the slipstream topology.

19. BUILT IN CONNECTIONS

Unit(s) shall be provided with additional built –in connections as mentioned below,

Connections	AHU Fan Speed Input	Input to YORK® Eco Advance™ 1000E
	BAS* Open OA Damper Input	Input to YORK® Eco Advance™ 1000E
	BAS Close OA Damper Input	Input to YORK® Eco Advance™ 1000E
	Energy Meter Dry Contact Input	Input to YORK® Eco Advance™ 1000E
	Available 24V Relay Output	Output from YORK® Eco Advance™ 1000E 24V/1A
	Available Dry Contact Output	Output from YORK® Eco Advance™ 1000E 1A (max)
	Available Dry Contact Input	Input to YORK® Eco Advance™ 1000E

*BAS - Building Automation System

20. POWER REQUIREMENTS

The unit is designed to work with single-phase AC power and can accommodate a range of line voltages and frequencies.

Voltage	MCA*	MOCP*
277	30.8	35.00
240	39.6	40.00
230	38.0	40.00
220	36.5	40.00
208	34.6	35.00

*MCA - minimum current ampacity; MOCP - maximum over-current protection

21. COMMUNICATIONS

Unit shall include state-of-the-art wireless communication capabilities for ongoing monitoring and reporting of indoor air quality, sorbent performance, and system operating conditions.

Communication	Cellular link	2.5G/3G
	Wireless link	915 MHz
	BacNet	MSTP

22. AIRFLOW MONITORING STATIONS

- 22.1. Unit(s) shall be provided with built-in sensors & software as described in earlier section to record and report all aspects of the unit(s) operation.
- 22.2. Unit(s) shall have custom SCADA (supervisory control and data acquisition) interface allowing users to view real-time and historical data to monitor IAQ and energy savings results.
- 22.3. Software data access shall be restricted. Only authorized users shall have a login with defined permission level providing access to a website where results can be monitored.
- 22.4. The data is to be uploaded via a wireless link. Wireless capacities are specified in the communication section.

23. POWER DISCONNECT

- 23.1. Unit shall be provided with integrated power disconnect built into control section.
- 23.2. Unit shall be provided with two 40 amp fuses @ 208/230-240v.
- 23.3. Unit shall be provided with two 35 amp fuses @ 277v.

24. MISCELLANEOUS FEATURES

- 24.1. Unit(s) shall work on a single phase 208-277 volt power input.
- 24.2. Wire size: 8 gauge wire for high voltage electrical connections, ¾" Heyco conduit connector shall be provided on top of unit.
- 24.3. Optional horizontal mounting kit at additional cost to be provided along with the unit for horizontal installation on the floor or in a ceiling as per on site requirement.

25. FINISHES

- 25.1. Unit(s) shall be clean before packing.
- 25.2. Manufacturer shall paint indoor units as scheduled below.
- 25.3. Manufacturer shall prewash the etch sheet metal surface.
- 25.4. Manufacturer shall apply a powder coated finish of hammer steel.
- 25.5. The finished unit shall meet or exceed 1000 hours salt spray test without any sign of red rust when tested in accordance with ASTM B-117.

26. TESTS & INSPECTION

- 26.1. Testing of DC fan assembly---
- 26.2. Fan should be completely tight mounted with 8-32 bolt with 40 inch lbs. torque.
- 26.3. Verify damper closing and opening.
- 26.4. Verify all heater operations is complaint.
- 26.5. Verify all sensors give a proper reading.
- 26.6. Verify power supply provides proper voltage to the main controller.
- 26.7. Verify proper fuses / circuit breaker is installed.
- 26.8. Each unit shall be fully tested for proper functioning including fan operation, heater operation, actuator operation, cartridge bank pressure differential and correct sensor measurements.

27. INSTALLATION (REQUIREMENTS & STEPS)

- 27.1. Unit shall meet all requirements of installations such as electrical power, wireless data connection and air duct connections.
- 27.2. Manufacturer shall provide the details step-by-step instructions and precautions for installations.
- 27.3. Installation of equipment shall be done as per industry standards, applicable codes and manufacturer's instructions.
- 27.4. Unit(s) shall not be put into temporary use prior to complete inspection and start up performed as per this specification.
- 27.5. Unit(s) shall be installed on a concrete pad, roof curb, or structural steel base, as shown in drawings.
- 27.6. Unit(s) shall be installed with manufacturer's recommended clearances for access and service.
- 27.7. Installation of seismic restraints and anchors shall be as per applicable local building codes. Refer to specification Section 230548 (15240 / 15070) for product and installation requirements.

28. CLEANING

- 28.1. Clean unit interior prior to operation. Remove tools, debris, dust and dirt.
- 28.2. Clean exterior prior to transfer to owner.

29. PRECAUTION

29.1. CARTRIDGE STORAGE:

- 29.1.1. Unit(s) cartridge sets shall be stored indoors away from direct sunlight in -10 °C to +35 °C (14°F to 95°F).
- 29.1.2. Cartridges shall be kept in their plastic wrap to protect them from moisture or damage prior to installation
- 29.1.3. Cartridges have a shelf life of one year from the day of shipping from the factory.

29.2. RECYCLING OF CARTRIDGES:

- 29.2.1. Cartridges shall be replaced and used cartridges should be placed in the packaging from the replacement cartridges, sealed, and shipped back using the return mailing label provided in the cartridge packaging.

30. STARTUP SERVICE AND OWNER TRAINING

Manufacturer's factory-trained and factory-employed service technician shall startup unit(s). Technician shall perform the following steps as a minimum:

- 30.1. Energize the unit disconnect switch.
- 30.2. Verify correct voltage, phases and cycles.
- 30.3. Provide a minimum of hours of training for owner's personnel by manufacturers factory-trained and factory-employed service technician.
- 30.4. Training shall include start-up and shutdown procedures as well as regular operation and maintenance requirements.
- 30.5. Submit a start-up report summarizing any problems found and remedies performed.

31. DOCUMENTATION FOR OWNER

Provide Installation Instruction Manual, & Start-up checklist directly to Building owner and/or operator.

32. MAINTENANCE

32.1. Unit shall be designed to require minimal on-site routine maintenance and Pre-filter replacement. Annual cartridge set replacement is the only required standard maintenance.

32.2. Unit(s) maintenance shall be performed by any certified technician.

33. QUALITY ASSURANCE

The design indicated on the schedules and shown on the drawings shall be based upon the products of the named manufacturer. Alternate equipment or solutions are acceptable only if specified/scheduled performance requirements and dimensional requirements are met.

END OF SECTION