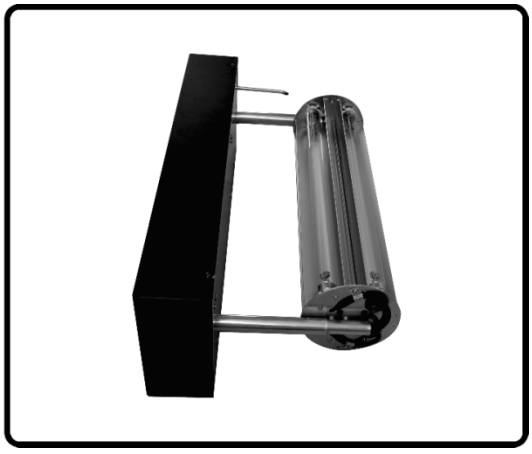
HAMSA IV™

In Duct UV Air Purification System

universal UV solutions™

INSTALLATION MANUAL



Due to a program of continuous improvement, Universal UV Solutions reserves the right to make design and/or specifications changes at any time.

Rev 2.2

CONTENTS

WARNINGS

Safety glasses and gloves must be worn. Follow all safety codes.

Before installation, maintenance or service to the unit, unit must be disconnected from its power source. Failure to disconnect power may cause electrical shock, leading to injury or death.

This unit emits ultraviolet (UV) light as part of its primary function. UV light is harmful to skin and yes, and may cause permanent injury. The unit should never be operated or maintained while exposed.

Use only replacement lamps supplied by Universal UV Solutions™ in the unit. Use of a non-approved lamp can damage both the lamp and the unit, and will void the warranty on the unit.

Do not handle UV lamps without protective gloves. Dirt and oils on the skin may greatly reduce the effectiveness and life of the lamp. Always clean the lamps with a lint-free cloth and isopropyl alcohol after handling. The UV lamps contain a small amount of mercury in the tubes. In case of breakage, handle and dispose of broken glass with care according to local regulations.

NO USER SERVICEABLE PARTS INSIDE

SAFETY AND PRE-INSTALLATION GUIDELINES

Before installation, maintenance or service to the unit, the unit must be disconnected from its power source. Failure to disconnect power may cause electrical shock, leading to injury or death.

Installation, maintenance and repairs should always be performed by licensed electricians and HVAC trained service personnel.

Depending on the specified model, each HAMSA IV™ requires either a 220V, 50hz power source or a 110V, 60hz power source capable of supplying 160W to the unit. Ensure that proper wiring gauge is used based on distance to the main panel and adequate for the operational voltage of the unit.

CAUTION: Prior to installing the unit, make sure that the operating voltage of the delivered unit matches the power feed. Connecting a 120V unit to a 220V supply will destroy the unit and will not be covered under warranty. The operating voltage is imprinted inside the unit, along with the serial number.

Each HAMSA IV™ must be hard wired to a separate panel breaker and installed in accordance to all guidelines as stated in NEC (National Electric Code), NFPA or any other applicable governing bodies depending on the country where the unit is installed.

The HAMSA IV™ is designed to be installed in either the return or supply plenum of an HVAC system and is designed to treat the entire air circulating through the system. Return plenum installation is preferred. System effectiveness is based on multiple factors including, but not limited to: duct size, air velocity, UV light reflectivity within the duct. For maximum efficiency, more than one HAMSA IV™ unit may be necessary. Please refer to an authorized distributor or your installer for more information.

CAUTION: If an air treatment humidifier is present in the HVAC system the HAMSA IV™ must be installed in the non-humidified air stream.

The HAMSA IV™ produces UV light as its primary function. UV light can be corrosive to many plastic components. Ensure any exposed plastic is properly shielded with rubber, silicone or aluminum shielding.

The HAMSA IV™ features a digital display to indicate several operational parameters of the unit such as lamp life and system health. The display can be removed from the unit, installed and operated up to 50 feet (15.25 meters) away from the base of the unit. If using the remote display feature, please note that wiring must be extended to the remote mount location and proper wiring and installation must be planned.

Installation of the remote mount option requires the use of a 6 conductor, 16 AWG, jacketed cable to be supplied by the installer. For information on the interface wire or to make a purchase of UUVS certified wire, please contact us at info@universaluvsolutions.com. Wiring for remote mounting is not included with the HAMSA IV™.

Operating voltage to the remote display is under 15 VDC.

The HAMSA IV™ uses a pressure differential switch and a Pitot tube to detect airflow in the HVAC system. The supplied vacuum switch is factory preset to 0.05" ± 0.02" H_2O. In order to function properly, ensure that there is a sufficient pressure differential within the HVAC system to activate the vacuum switch. Differential pressure is measured by the switch using a "HIGH" and "LOW" port. Different mounting locations may require a different configuration to feed the Pitot tube. If this is necessary, carefully remove the plastic tube connecting the Pitot tube to the switch and insert it into the proper port. When installed in the return, the Pitot tube should be connected to the "LOW" port. The HAMSA IV™ is factory shipped with the "LOW" port connected.

The HAMSA IV™ can be installed in any position as long as the pressure sensor is on a vertical plane. The sensor will not operate correctly if installed lying flat on a horizontal plane. ***(Figure 1)*** If the HAMSA IV™ is not able to be installed for the vacuum sensor to properly function the sensor must be bypassed. ***(Figure 5)*** Bypassing the sensor will continuously run the unit regardless of airflow in the duct unless the unit's power feed is wired in parallel to the fan circuit.

CAUTION: Only wire the HAMSA IV™ in parallel the fan circuit if the fan operates at a constant speed and has the same voltage as the unit. 120V and 220V options of the HAMSA IV™ are available; please check the unit before wiring directly to the fan circuit. A variable speed fan, wired in parallel to the unit will permanently destroy the HAMSA IV™.

The HAMSA IV™ is capable of operating at temperatures between 5-60°C.

The HAMSA IV™ does not have a weatherproof housing and is not intended for outdoor use. Make sure proper heat dissipation is provided to the unit. If using the remote display feature, all wiring and connections between the display and the unit must also be properly weather and waterproofed.

INSTALLATION INSTRUCTIONS

Before installation, ensure that any plastic or exposed wiring is covered by a UV-resistant material such as Teflon® or aluminum tape. All HVAC equipment should be turned OFF during installation.

Locate the Pitot tube on the inside of the HAMSA IV™ cover. This sensor must be oriented in the same direction as airflow ***(Figure 2)***. If necessary, remove the pressure hose, unscrew the probe, and rotate it accordingly so the arrow imprinted on the sensor matches the air flow.

Cut a 21" x 6" sized opening in the duct work at the chosen installation location. Use caution to avoid sharp edges.

The HAMSA IV™ features adjustable-length arms for optimal duct placement. For installation of a single unit, optimal placement is at the center of the duct. For two unit installations, each unit should extend approximately 1/3 of the way into the duct on each side. Measure the desire length of the arms form the back plate so they are properly adjusted. Lightly, rest the body of the unit on a table while holding lamp turret on top. Loosen the two locking screws on the arms in order to adjust the placement of the lamps. After both screws have been loosened raise or lower the lamp turret, maintaining the body in parallel, until the proper arm length is achieved. Then re-tighten the locking screws in position.

CAUTION: Do not remove the adjustable screws.

Use a rubber or weather gasket (not supplied) to maintain a tight seal between the HAMSA IV™ and the duct work.

Once the arms are adjusted and locked, insert the HAMSA IV™, lamp mount first, into the duct work opening. Use sheet metal screws to mount the unit to the duct work.

ELECTRICAL CONNECTION

Remove one knockout from the HAMSA IV™ and insert the appropriate Romex or BX connector depending on the type of wire used.

Firmly connect the hot, neutral and ground wires to the supplied leads using a wire nut or similar.

In order to work properly the vacuum sensor of the HAMSA IV™ must be able to detect a pressure differential of ± 0.02" H_2O, caused by airflow through the duct. In applications where airflow operates with variable speeds, a "low" setting may not cause enough pressure differential for proper operation of the HAMSA IV™.

If the HAMSA IV™ is to be installed face down ***(Figure 1)*** or there is insufficient pressure differential, the vacuum sensor has to be bypassed.

CAUTION: Only wire the HAMSA IV™ in parallel the fan circuit if the fan operates at a consistent speed and has the same voltage as the unit. 120V and 220V options of the HAMSA IV™ are available, please

check the unit before wiring directly to the fan circuit. A variable speed fan, wired in parallel to the unit will permanently destroy the HAMSA IV™. ***(Figure 1)***

LAMP REPLACEMENT

Any maintenance or service must be performed only after the unit is disconnected from its power source and the HVAC system is turned off.

Use only authorized replacement lamps in the HAMSA IV™ system. Any other lamps will void the warranty on the entire unit and may damage the unit. It is recommended to replace all the lamps simultaneously to maintain the rated performance of the unit. If only one lamp needs to be replaced, for example due to a breakage, do not reset the hour counter.

After replacing all the lamps, ensure the lamp timer is properly reset.

REMOTE MOUNTING INSTRUCTIONS

Turn the power off and verify that power is not running to the unit.

Remove the cover from the unit.

Note the location of the power supply board as well as the location of the microcomputer board.

Unmount both boards carefully as to not disturb any connections inside the unit as well as to the boards.

Carefully remove the six connecting wires from the terminal blocks one at a time until all six wires are removed from the power supply and microcomputer boards. Keep the removed wires with the manual in a safe location.

Use a Universal UV Solutions™ approved, six conductor, color coded, stranded, 18 AWG, unshielded control cable between the HAMSA IV™ and the location where the display will be mounted.

CAUTION: Do not exceed 50 feet (15.24 meters) in total length

Replace the short connecting wires between the display and power supply panel with the extension harness.

Insert the six conductors into the power supply board carefully, noting the color coding.

Run the extension cable through the secondary knockout opening next to the power cable knockout and onto the desired display location. The pre-installed connecting wires are color coded. When rewiring, the connections must be made in the same configuration. Improper wiring will damage the unit and void the warranty.

Before restoring power to the unit check that each color coded terminal matches the color coded connections on the opposite terminal.

Using gloves, carefully remove the UV-C lamps from the shipping box. Insert and rotate each lamp into the corresponding sockets making sure all four pins are properly aligned and making contact with the sockets.

CAUTION: Do not use excessive force when installing the lamps

OPERATING INSTRUCTIONS

Once installation is complete, restore power to the HVAC system and the HAMSA IV™ and start the HVAC fan. The HAMSA IV™ will detect airflow within the system and turn on. The HAMSA IV™ will only operate if there is airflow through the system and there is a pressure differential greater than ± 0.02" H_2O.

The HAMSA IV™ features a digital display that monitors lamp operation. ***(Figure 3)***

During normal operation, each digit on the display corresponds to an individual lamp in the unit and all 4 digits display steady numbers. When holding the unit horizontally, the left side of the light array, near the Pitot tube, has an engraved indication identifying the location of lamps 1 to 4.

If the system detects any issue with a lamp, the following alerts will occur:

- The corresponding lamp number will blink as a visual alarm
- The system will generate an audible buzzer alarm, if enabled
- The system will communicate the lamp malfunction via the building management system (BMS-enabled option only)

The HAMSA IV™ features a built-in lamp timer, which is set for the effective life of the lamps (18,000 hours). When the timer expires and the unit is operating the digits on the display will be replaced by a scrolling message reading "REPLACE ALL BULBS."

To reset the lamp timer after lamp replacement tap the "MODE" button to scroll to the proper menu, then press and hold the "MODE" button for five seconds.

To display the number of useful days remaining for the lamps, tap the "MODE" button to scroll to the days left menu. The number of days left is indicated by the letter "d" followed by the number of days left.

EXAMPLE: "d123" means there are 123 days of useful UV-C light remaining

To reset the days counter, scroll to the menu "hold to reset days counter" and press and hold the "MODE" button for 5 seconds until a long, audible beep can be heard.

NOTE: If the display is not on the main menu screen it will automatically revert after 10 seconds of inactivity.

The only way to reset a bad lamp alarm is to replace the bad lamp(s) as indicated on the display.

To enable/disable the audible alarm, scroll to the proper screen and hold down the “MODE” button until a long beep is heard and the display scrolls either “BEEPER ENABLED” or “BEEPER DISABLED”. This feature can be toggled on ON/OFF and will be preserved during power brownouts.

NOTE: Audible indication for key presses cannot be disabled.

When there is no airflow detected and the UV lamps are not energized the display will scroll “UNIT IN STANDBY.”

BMS CONNECTION

The dry contact is energized under normal operating conditions. C-NO is shorted while C-NC is open. When the alarm is triggered by a bad lamp, expired lamp or loss of power, C-NO will be open and C-NC will short. This allows the BMS to monitor and report alarms if power to the unit is lost, but not when the unit is in stand-by.

To wire the BMS strip 9.5mm (3/8”) off the end of the wires and insert them into the proper terminals. ***(Figure 4)***

BALLAST INDICATION

The HAMSA IV^{YM} has four internal LEDs that indicate normal operation of each ballast. They are normally lit when the unit is operating and off when the unit is in stand-by. During operation, if any of the ballast indication LEDs do not light up, that ballast has failed.

FIGURES

Figure 1 - Installation Orientation

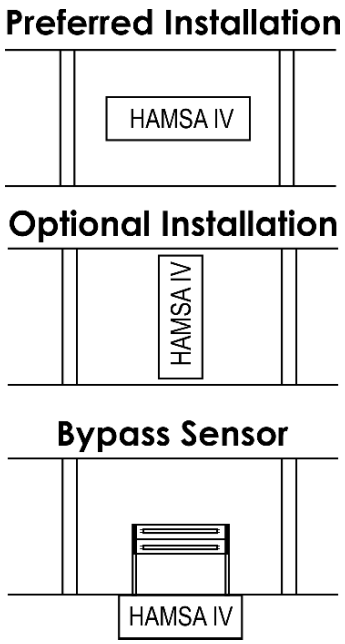


Figure 2 - Pitot Tube Orientation

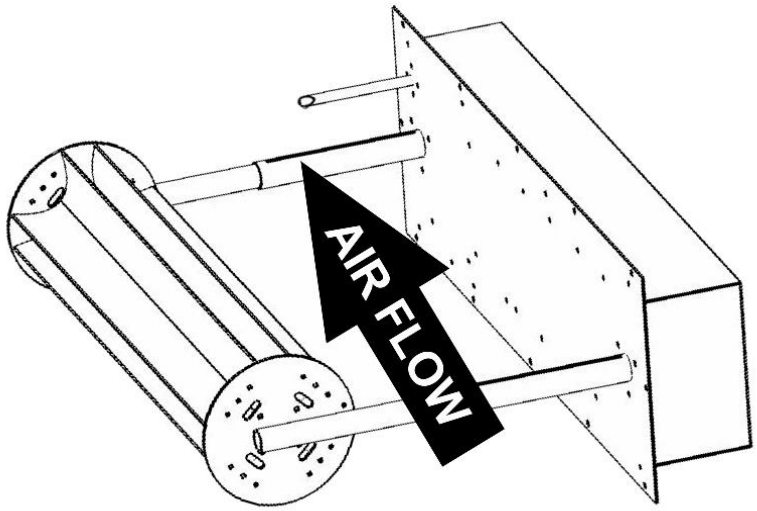


Figure 3 - Digital Display

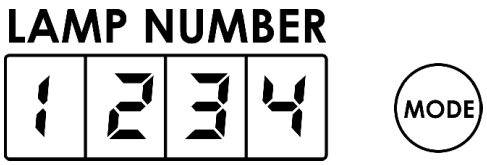


Figure 4 - BMS Wiring

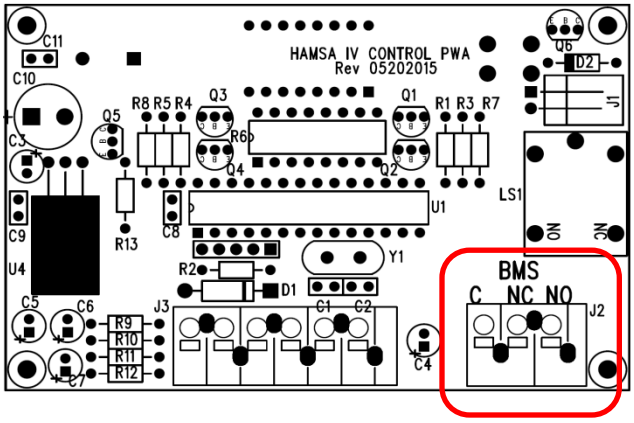
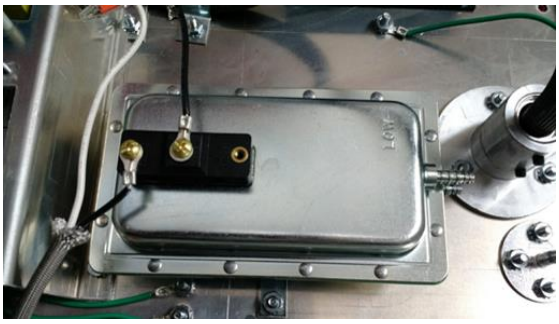


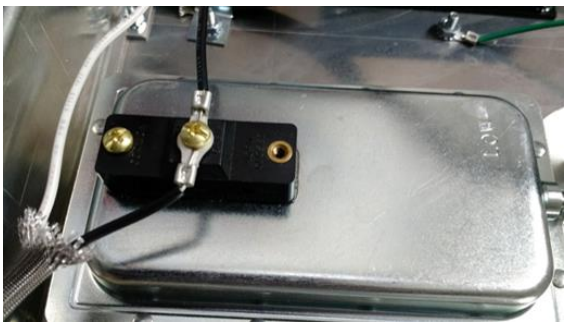
Figure 5 - Bypassing the Pressure Switch

After power is turned off, or prior to installation, the pressure switch can be bypassed by moving the wire from the bottom of the pressure switch to the center terminal.

Active Pressure Switch



Bypassed Pressure Switch



WIRING DIAGRAM