HQAir Industrial - Multilamp Ducted Hydroxyl Unit (MDU) - User Guide

Introduction

The Multi-lamp Ducted Hydroxyl Unit (MDU) is a modular system that produces Hydroxyls to destroy odours, mould, viruses and bacteria both in the air and on surfaces. The MDU can contain a combination of Hydroxyl Generation Units (HGUs), HEPA filter, carbon filter and a light baffle to suit your requirements.

The front of the unit is the long side away from the power inlet socket, and looking at the front of the unit air flows through it from right to left. The main housing consists of three chambers. In a standard MDU5 system the right side chamber contains the filters, the central chamber contains the HGU tubes that produce Hydroxyls and the left side chamber contains a light baffle that prevents UV light escaping. Air flow through the main housing of a standard MDU5 unit passes through a filter chamber (containing a pre-filter, a HEPA filter, and a carbon filter), the tube chamber that produces the Hydroxyls, then finally through a light baffle chamber. Air flow through the topcap, which contains the HGU controllers, moves from right to left past the filter foam, through the topcap and out through the three 80mm fans. An optional air shroud can be installed on the left side that allows a blower to be attached to draw air through the main housing. See the *Optional extras* section for more information.

The MDU is available as an MDU5, MDU10 or MDU15 configuration, with the number referring to the number of HGUs installed in the unit. The standard unit is the MDU5, which has 5 HGUs plus HEPA and carbon filters. See the *Optional extras* section for more information.

Power

The MDU does not have a power switch, it is live when a live power cord (IEC320-C14, the standard jug or PC cord) is connected. When connected to power the left row of 5 blue LEDs on the powerbox will light. This will take a few seconds for them all to light as the HGUs come on, and a few seconds more for the tubes to light up inside the MDU. At this point the MDU is generating Hydroxyls.

Indicator lights

There are two rows of 5 LEDs on the top of the unit. The row of 5 blue LEDs on the left indicate there is power to an HGU, with the position of the LED corresponding to the position of the HGU inside the unit. The row on the right side are red LEDs, and indicate a fault with the HGU corresponding to the same position inside the unit, ie the LED second from the front corresponds to the HGU that is second from the front.

If a red LED is lit or a blue LED fails to light when power is applied, there is a problem with an HGU or an HGU is missing. Please contact your reseller for more information.

Airflow

The MDU needs airflow to work. The Hydroxyls generated by the system are fast-acting, but to do their job they need to be moved to the site of contamination or have contaminated air drawn past the tubes. If the system is installed in ducting the airflow can be provided by the ducting system. If the system is freestanding a blower can be connected to

the MDU on the outlet (left) side to draw air through the unit at up to 150L/s, or 320cfm. This maximum airflow rate is a limitation of the HEPA filtration, and if a configuration without the filter is chosen (see *Optional extras* section) the maximum air flow rate increases significantly. An air shroud for round inlet blowers is an available option (see *Optional extras* section).

RS485 connector

The MDU has an RS485 connector on the front left side of the topcap. This will be used for control systems that are currently being developed, which will allow remote control of the HGUs inside multiple MDUs. Please contact us for further information if required.

Optional extras

The standard form of the MDU has 5 HGUs in the centre, with HEPA and carbon filters on the inlet side and a light baffle on the outlet side to prevent UV impact outside the MDU. This is known as the MDU5. Different filters can be specified, or If the filters or light baffle are not required, their space can optionally be used to configure the unit with more HGUs as an MDU10 or MDU15. If required, multiple MDUs can also be connected in series or parallel to increase the Hydroxyls produced.

An optional air shroud is offered that will mate up to a 200mm blower with a round inlet.

MDU10 configuration

If either the light baffle or the filters are not required, one of their bays can be used to hold an extra set of HGUs. This can be positioned on either the inlet side in place of the filters, or on the outlet side in place of the light baffle. Note that if the light baffle is not used then the emission of UV light from the unit will be very strong, and appropriate protection and/or shielding will be required. The unit will be referred to as MDU10+Filter or MDU10+Baffle depending on what the extra set of HGUs replaces. Note that maximum airflow will increase significantly if the filters are omitted, and that two power sockets will be required.

MDU15 configuration

If neither the light baffle or filters are required, perhaps because the unit is to be duct-mounted, the light baffle and filters can both be replaced with extra HGU sets. This will produce a unit with 3 banks of 5 HGUs that will produce significant amounts of hydroxyls. Note that maximum airflow will increase significantly since there will only be the tubes in the unit, with no filters or light baffles to impede the air. Three power sockets will be required.

Air shroud

The air shroud is a kit comprising a rubber adapter boot, a stainless steel mounting plate and fasteners that together will allow the round inlet port of a blower to be connected to the outlet (left) side of the MDU, so the air is drawn through the MDU by the blower. The shroud can be trimmed to suit the blower inlet side desired from approximately 150mm to 250mm, or left unchanged to allow different sized blowers to be used at different times.

1. Is there any experience in China? if any, please provide the information/evidences

   The product has been in China (as the smaller units and limited industrial applications). The 5 optic unit is a new generation of the product developed to meet needs in medical/office/commercial and light industrial applications. The core Hydroxyl technology has been developed and implemented for over 10 years in medical facilities through to cruise ships and commercial applications. We currently have installs in a couple of hospitals in China – personal units providing treatment directly over the patients/staff. The expansion of this is awaiting the results of units to be tested in Beijing against the virus. Testing of the personal unit has been done on H1N1 virus in China and the results have been previously supplied.

2. One equipment may cover 15,000sft, what is the limit on height or air flow rate of one equipment? As you may know, there is many stadiums have remolded to shelter hospitals. The height of stadium is more than 10m plus which is different with normal hospital. Please clarify the volume size (space) for one equipment;

   The airflow from the unit can be directed over the areas to be treated. Given the stadiums and larger areas being used as response centers, the focus should be on treating the air and using fans/air movers to distribute the treated air over the patients, bedding, hard surfaces. This will reduce the air-born virus and deactivate the virus on surfaces much faster. The small unit has a built-in fan and is suitable to blow over the patient, which will reduce the potential transfer from aerosolized mucus and provide some relief for their breathing – evidence of which we are getting documented from the hospital near Shanghai. This means a unit like this can treat a larger floor space and not focus on the total air volume – especially as the risk is from the patients and cross infection from the protective equipment worn by the staff.

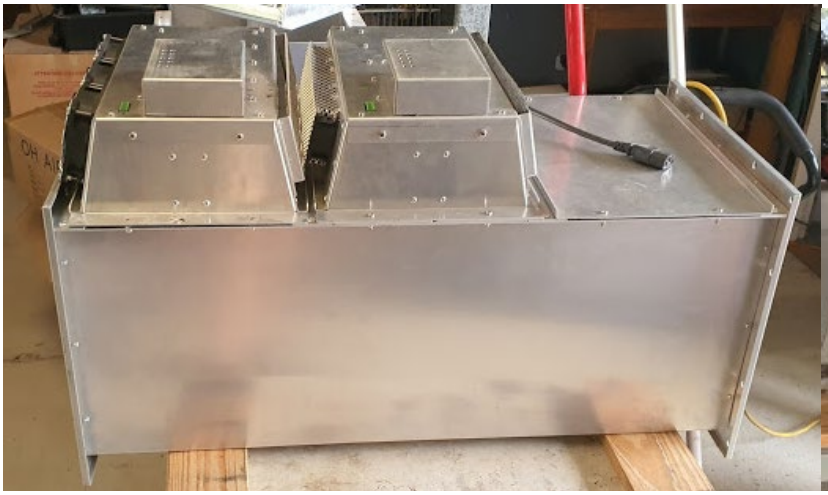
5 Optic unit with blower/air mover that will provide a directed stream over the area to be treated.

   One way the units can assist with cross infection – especially with the lack of protective equipment is the wetting of the Tyvek materials, visors, bedding with pure water/1-2% peroxide and drying with the Hydroxyl treated air. This will increase the activity of the air on the surface and greatly reduce the risk to the staff and cross infection for the patients.

   The impact of the larger systems and small units for personal use can be demonstrated by the results on

the hospital borne infection of a patient in South Africa. This was bacterial, however the impact was directly on the wound and lung function as a result of the Hydroxyl exposure to the infection and similar results (based on the surface and aerosolized tests) will be seen with Viral contamination.

3. There is many central AC/HAVC in hospital and office building, the demand is how to kill the virus in AC system otherwise they have shut down the system to avoid the infect. Please clarify how to connect AC in those area with your equipment. If the equipment is installed, what is the expected result?




The unit as pictured can also be installed into the ducting system for HVAC use. The housing can carry up to 15 optics for larger installations and will be sized, scaled to provide adequate treatment to the airflow. The airflow can be direct through the unit for maximum impact of treatment or treat a split of the air from the main flow and the oxidant will treat the air through the ducting.

Total oxidant sensors can also be installed to control the level of residual oxidant through the occupied space. This, depending on regulations in the region is usually controlled to around 50ppb. The levels used in the FDA safety studies was tested at up to 250ppb with no impact on mucosal membranes, lung or eye tissue. In fact, comments were made on how attentive, relaxed and interested the rats were during the study,

The expected result is the reduction/removal of pathogens, odour and VOC's in the treated airflow and environs (Where a residual oxidant level is maintained). The reductions obtained in the FDA aerosolized pathogen study can be obtained under these conditions. This does not include localized point sources, but their spread and general impact will be controlled in a manner that is completely safe for the occupants (staff and patients). This has been demonstrated in Israel where there is a 98% reduction in pathogen cross-contamination in the ward, surgery and recovery area when the technology was installed in the HVAC system.

4. Does the Bactericidal Efficiency is decayed with the use time?

No. This is why the life of the optics is controlled. If there are filters installed, they will need to be cleaned and replaced on a schedule depending on the level of contamination in the application.

The Optics should be installed with a pre-filter to reduce particulate contamination. This should be checked and cleaned every few weeks to months depending on possible contamination. This can also be automated by installing a differential pressure sensor that triggers a service on increase of backpressure. The optics themselves need changing every 12,000 hours. They will still be operating past this point; however, the oxidant output will have reduced by about 20-30% at this point a replacement is required to ensure efficacy. The hours of use is monitored and controlled into the drivers themselves and can be reported by a control interface, so that the need to service can be monitored and a service schedule setup based on actual use monitored from a central location.