
















HUMIDIFLOW™ Installation Manual
SeQual® Integra™ Ten
Models 6323A-OM-10 & 6323A-10
(HMK-SI)



Important Safety Notes

	Warning: Do not open the case of an oxygen concentrator if it is connected to a power supply. There is a serious risk of electric shock.
	Warning: Follow all safety warnings outlined in the documentation provided with each specific oxygen concentrator.
	Warning: The HUMIDIFLOW™ is only to be installed by a trained professional technician.
	Warning: The HUMIDIFLOW™ does not reduce the dangers associated with concentrated oxygen. Observe all necessary precautions when using an oxygen concentrator.
	Caution: Read through all documentation and instructions for each specific oxygen concentrator before installing a HUMIDIFLOW™.
	Caution: Do not attempt to service or open the HUMIDIFLOW™. It is designed to be maintenance-free.
	Caution: It is very important that the filters on the oxygen concentrator be changed with regularly scheduled maintenance. Reduced performance or damage may result from improper maintenance.
	Caution: Do not add water to the HUMIDIFLOW™.
	Caution: The HUMIDIFLOW™ components (i.e. tubing, etc.) should not come into contact with any moving parts (i.e. fans) inside of the concentrator.
	Caution: Do not touch or molest the fibers inside of the HUMIDIFLOW™ module in any way. Doing so could damage the HUMIDIFLOW™.
	Note: Do not modify or move any of the fittings attached to the HUMIDIFLOW™. Each model has been tested in a specific configuration, and modifying it may cause irregular performance.
	Note: The HUMIDIFLOW™ is designed to add water vapor to the outlet oxygen stream. This will cause the output oxygen concentration to read slightly lower or, with some meters, inaccurately. The results are similar to adding a bubble humidifier before measurement. To accurately measure the oxygen output from the concentrator, use Porous Media P/N ID-1406 (In-Line Dryer), or test the oxygen upstream of the HUMIDIFLOW™.
	Note: The output flow rate of the oxygen concentrator should be checked and adjusted as necessary, using a calibrated flow gauge, following HUMIDIFLOW™ installation.



Important Safety Notes



Note: Incorrect installation of the HUMIDIFLOW™ may invalidate its warranty or cause unsatisfactory results.



Note: The exact vertical and horizontal orientation of the HUMIDIFLOW™ module is unimportant and the module will work equally well in any orientation.



Installation Instructions

SeQual® Integra™ Ten (HMK-SI) Installation Instructions

Required Tools:

One #2 Phillips screwdriver
One Utility knife or cable snips
One Pair of pliers

Included parts: (See Picture A)

One HUMIDIFLOW™ (w/ appropriate fittings and tubing pre-installed)
Two Long cable ties
Two Large cable ties
Two Small cable ties

Installation Procedure:

1. Remove the 5 screws on the back of the unit.
2. Remove the back cover.
3. Remove the front cover.
4. Remove the 4 screws with locking nuts holding the front display on. Disconnect the back up battery.
5. Locate the short section of tubing connecting the yellow flow valve to the black and green check valve.
6. Remove the short section of tubing between the black and green check valve and the yellow flow valve. Two cable ties will have to be cut in order to remove the tubing. This piece of tubing may be discarded. Be careful not to pinch, kink or disconnect the other pieces of tubing or circuit board connections. (See Picture B)
7. Attach the ¼ inch tubing coming from the HUMIDIFLOW™ with the in-line bacteria filter to the open port on the black and green check valve. Secure with a small cable tie. (See Picture C)
8. Attach the other piece of ¼ inch tubing coming from the HUMIDIFLOW™ (without the in-line bacteria filter) to the open port on the yellow flow valve. Be sure to feed some of the excess tubing into the front display compartment and ensure that the line is not kinked on either end. Secure with a small cable tie. (See Picture D)
9. Re-connect the back up battery then reattach the front display using the 4 screws and nuts. **Be sure that none of the tubes are pinched or kinked.** The HUMIDIFLOW™ should be situated such that the tubing with the in-line bacteria filter should run down the right side of the concentrator when viewed from the front near the intake filter. The other section of ¼ inch tubing (without the in-line bacteria filter) should run down the opposite (left) side of the display housing when viewed from the front.
10. Locate the 2 sets of 4 holes in the center divider (that divides the front and back of the concentrator) near where the front display is attached. 1 set on each side.
11. Run the long cable ties through the lowest open holes from the rear compartment to the front compartment. (See Picture E)
12. Position the HUMIDIFLOW™ under the front display so that the ports are facing down and the side of the HUMIDIFLOW™ with the tubing that has the in-line bacteria filter connected is on the right side of the concentrator and next to the intake filter when viewed from the front. (See Picture F)



Installation Instructions

Installation Procedure (continued):

13. Secure the HUMIDIFLOW™ in place using the two long cable ties that were fed through the center divider of the concentrator. Make sure that the two ¼ inch tubes connected to the HUMIDIFLOW™ run in front of the HUMIDIFLOW™ so the module does not compress or pinch the lines. (See Picture F)
14. Disconnect the ½ inch tubing from the exit port of the white assembly which houses the inlet filter located next to the compressor. This is located in the front section on the right of the concentrator when viewed from the front. (See Picture G)
15. Attach the ½ inch tubing coming from the HUMIDIFLOW™ to the exit port of the white assembly which houses the inlet filter. Make sure to run behind the smaller ¼ inch tubing. Secure with a large cable tie. (See Picture H)
16. Run the ½ inch tubing connected to the compressor to the open port on the HUMIDIFLOW™ and secure with a large cable tie. Make sure to run behind the smaller ¼ inch tubing. (See Picture I)
17. **Double check to ensure that none of the lines are pinched or kinked.**
18. Reattach the front cover.
19. Reattach the back cover.
20. Replace the 5 screws to secure the covers.
21. **Test the system for leaks by setting the concentrator to an oxygen flow rate of 0.5 lpm. Once the flow rate is achieved, briefly and completely block the output oxygen. If the concentrator gives a yellow flashing warning within 30 seconds (O₂ Flow Rate Not Correct), there are no leaks in the oxygen tubing.**

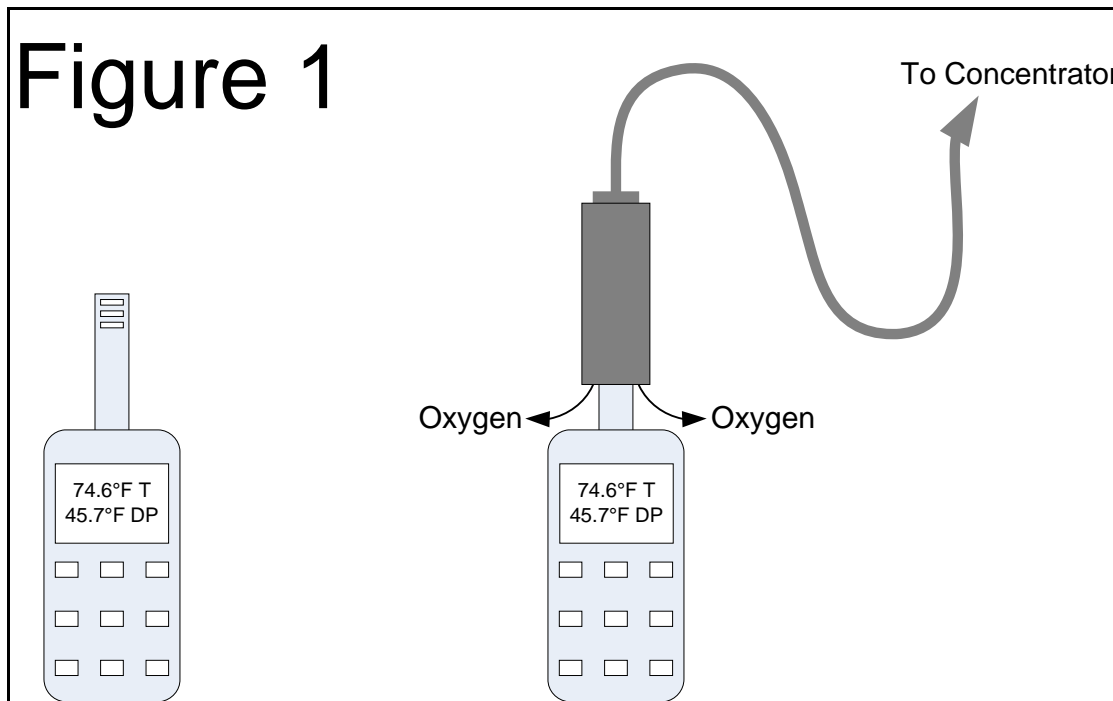


Optional Performance Verification

Each HUMIDIFLOW™ is put through a series of tests prior to leaving our facility to ensure a high quality product that will perform well for many years. To ensure long life and optimal performance, it is important that the filters in the O2 concentrator are replaced according to the mfg.'s recommended schedule and in some cases (i.e. cigarette smoking indoors) more often than recommended. Proper and timely replacement of the filters will ensure peak performance of both the HUMIDIFLOW™ and the O2 concentrator. If you wish to check the performance of the HUMIDIFLOW™, please use the following procedure.

You will need a humidity sensor with a humidity probe that can be enclosed by tubing (see Figure 1). We recommend a humidity sensor that has at least an accuracy of $\pm 3\%$ of reading, preferably $\pm 2\%$ of reading or better. This sensor also needs to have the ability to read out moisture level as dew point. This is important because most oxygen concentrators warm the out coming oxygen, and relative humidity (RH) is strongly affected by temperature. Dew point is not affected by changes in temperature. There are many places to buy such a unit. Not all of these units will be able to read out in dew point, so it's important to verify this feature. The unit that is used by the manufacturer for HUMIDIFLOW™ testing is Lufft model C200. It is available through McMaster Carr (<http://www.mcmaster.com/>) as part number 6495T98, but may also be found elsewhere.

Note: While Figure 1 shows two humidity sensors, it is best to use only one sensor for both measurements, due to slight disagreement between sensors.





Optional Performance Verification

Testing Instructions:

1. Place the concentrator in a stable environment. (One where the temperature and relative humidity change slowly.)
Note: Use an environment that is at normal environmental relative humidity (at least 30% RH or 40°F dew point). If the environment is very dry, it will be difficult to measure the HUMIDIFLOW™ performance.
2. Make sure that the concentrator has a new inlet filter and a new outlet final filter. If either filter has a high pressure drop, it will reduce the HUMIDIFLOW™ performance.
3. Turn on the concentrator and allow it to warm up. Allow at least 30 minutes if the concentrator has come from a different environment, such as a cold vehicle.
4. Once it has warmed up, set the oxygen flow to 3 liters per minute.
5. Turn on the humidity sensor, place it near the oxygen concentrator, preferably near the air inlet, and allow it to stabilize at the dew point of the room.
Note: Do not breathe near sensor nor have it near a person.
6. Record the room dew point.
7. Enclose the probe of the humidity sensor in tubing from the oxygen concentrator. It may be necessary to install an adapter with larger diameter tubing at the end to fit over the probe. See Figure 1
Note: Make sure that the tubing completely encloses the open portion of the probe. Make sure also that the fit over the probe is loose enough to easily allow the oxygen to exit around the probe.
8. Allow the humidity sensor to stabilize at the dew point of the oxygen.
9. Record the oxygen dew point.
10. If the HUMIDIFLOW™ is working correctly, the dew point of the oxygen should be within 7°F (4°C) of the ambient room dew point.
Note: There are many factors that can affect the performance of the HUMIDIFLOW™ device once installed in an oxygen concentrator. Any pressure drop in a gas stream dries the stream slightly, so inlet filters, restrictive tubing, and sound abatement equipment producing a pressure drop in the air stream will dry the air slightly before entering the HUMIDIFLOW™ and thus reduce the dew point of the outlet oxygen slightly. Pressure drop in the outlet filter or any constricted tubing will reduce the oxygen pressure and thus dry it slightly after leaving the HUMIDIFLOW™. Small oxygen concentrators (3 lpm units) intake less air into the HUMIDIFLOW™ and thus do not humidify the oxygen quite as well as larger 5 and 10 lpm units.



Frequently Asked Questions

Q: *How can I increase the humidity of the output oxygen in a very dry room?*

A: The HUMIDIFLOW™ uses the intake room air to humidify the output oxygen. To increase the humidity of the output oxygen, simply place a room air humidifier in the same room as the oxygen concentrator.

Q: *How often does the HUMIDIFLOW™ need to be serviced?*

A: The HUMIDIFLOW™ is designed to be maintenance-free. Regular maintenance of the oxygen concentrator includes filter cleaning and/or changes, which will maintain the efficiency of the HUMIDIFLOW™. The module itself does not require any additional service.

Q: *Can I use an external humidifier bottle on a HUMIDIFLOW™ equipped oxygen concentrator?*

A: It is not necessary to use a humidifier bottle in conjunction with a HUMIDIFLOW™. However, a humidifier bottle can be used for additional humidification, if desired.

Q: *Do I need to use an in-line water trap with a HUMIDIFLOW™ equipped oxygen concentrator?*

A: Since the HUMIDIFLOW™ does not transfer liquid water to the output oxygen, an in-line water trap is not required.

Q: *Does the HUMIDIFLOW™ affect the accuracy of the built-in flow gauge on my oxygen concentrator?*

A: No, the flow gauge maintains the same level of accuracy that it had without a HUMIDIFLOW™ installed.

Q: *Will installing a HUMIDIFLOW™ affect the portable cylinder filling function of my oxygen concentrator?*

A: No. The HUMIDIFLOW™ is integrated in such a way that it does not affect the oxygen used for filling a portable cylinder. The oxygen supplied to the filling port remains un-humidified, and cylinder filling is unaffected.

Q: *Can I expect to see condensation (rain-out) in the oxygen supply tubing as a result of installing a HUMIDIFLOW™?*

A: No. The HUMIDIFLOW™ will never humidify the oxygen stream above the ambient level. Additionally, HUMIDIFLOW™ specifically transfers molecular water to the oxygen stream, so it will not be encumbered by liquid water.



Trouble Shooting Guide

Problem	Probable Cause	Solution
The unit does not power up after HUMIDIFLOW™ installation.	Power cord not plugged in. Circuit breaker tripped.	Insert plug into power outlet. Refer to oxygen concentrator documentation for instructions on resetting.
The unit does not put out sufficient flow after installation of the HUMIDIFLOW™.	The flow control knob is improperly adjusted. The oxygen flow is being obstructed. There is a leak in the oxygen tubing or fittings. The in-line oxygen filter is restricting the flow.	Adjust flow to prescribed level using flow control knob. Check all oxygen lines to ensure they are not kinked or pinched. Check all fittings for leaks, and re-secure as necessary. Ensure that the in-line oxygen filter is has been changed.
The yellow flashing warning does not occur within 30 seconds when testing the unit after installation of the HUMIDIFLOW™.	The output flow is not being completely blocked. There is a leak in the oxygen tubing or fittings.	Completely block the oxygen flow to accurately test the system. Check all fittings for leaks, and re-secure as necessary.
The unit alarms or displays a low O ₂ warning after installation of the HUMIDIFLOW™.	The oxygen flow is being obstructed. There is a leak in the oxygen tubing or fittings. The in-line oxygen filter is restricting the flow. The intake air is being restricted.	Check all oxygen lines to ensure they are not kinked or pinched. Check all fittings for leaks, and re-secure as necessary. Ensure that the in-line oxygen filter is has been changed. Ensure that the air intake filter is has been changed.
The output oxygen concentration seems to have dropped significantly after installing the HUMIDIFLOW™.	The measurement device is providing an inaccurate reading because of the humidified oxygen stream. The oxygen flow is being obstructed. There is a leak in the oxygen tubing or fittings.	Ensure that the recommended in-line dryer is in place, drying the oxygen for an accurate measurement. Also verify that the dryer is new or recently regenerated, as a saturated dryer will cause inaccurate readings. Check all oxygen lines to ensure they are not kinked or pinched. Check all fittings for leaks, and re-secure as necessary.



NOTES: