



## ComAir 20T Basic Operations

The ComAir20T is a commercial air treatment unit utilizing dual UV bulbs to both sterilize and oxidize airborne microorganisms and other organics. At the heart of the ComAir20T is a sophisticated custom designed ballast with an integrated microcontroller. The ballast drives two lamps. One lamp is specifically designed to emit light with a wavelength of 254nm. Light at this wavelength is efficiently absorbed by the DNA of living microorganisms. A sufficient amount of 254nm light will render the microorganism unable to reproduce thus making it harmless.

The second lamp is specifically designed to emit light with a wavelength of 185nm. Light at this wavelength is absorbed by oxygen molecules, which causes the O<sub>2</sub> molecules to split and produce O<sub>3</sub> after some interim steps. The integrated microcontroller monitors the lamp characteristics to maximize lamp life and allows the ozone lamp to be dimmed. The ComAir20T can also interface to an ozone monitor and it can regulate the ozone to maintain maximum odor neutralization while ensuring safety.

### Key Features

- A custom designed ballast with PFC input section, low voltage power supply and two unique drive sections to power two different UV lamps under the control of a microcontroller which takes in signals from among other things, an air flow probe and an external ozone monitor.
- Universal Power 90-277V 50/60 Hz.
- Terminal Block and strain relief receptacle to accommodate a variety of cords.
- Modular second drive board allowing for two germicidal lamps (600  $\mu\text{W}/\text{cm}^2$  at 1m) or one germicidal lamp (300  $\mu\text{W}/\text{cm}^2$  at 1m) and one ozone lamp.
- Germicidal drive section is specifically designed to drive our 300  $\mu\text{W}/\text{cm}^2$  at 1m lamp. The drive circuit doesn't preheat for a predetermined amount of time as is commonly done, instead the circuit actively monitors the lamp and arcs the lamp only when the lamp's filaments have reached the proper temperature. This ensures the lamps arc properly and safely regardless of lamp variations or current environmental conditions.
- Ozone drive daughter board is specifically designed to drive our 185 nm ozone lamp. The lamp utilizes hot filaments which maximize ozone output, but results in a lamp that is more delicate than its cold cathode counterpart. Dimming of this lamp is achieved without harming the lamp by using a microcontroller to continuously monitor the lamp. This technology ensures that the lamp is being driven properly as it is dimmed as well as ensuring that the lamp is being driven properly regardless of lamp variations, air temperature variations, or air speed variations.
- 20,000hr lamps.
- The low voltage power supply produces dual voltages. One 12V supply relative to the negative portion of the AC input waveform to allow the microcontroller to directly monitor the lamp characteristics. The other supply is at 18V relative to ground to safely power the user interface.
- All user interface signals (three types of ozone monitor signals, remote push button, and remote indicator light signals) are set through optoisolators to isolate the user's signals from the microcontroller's voltage which is relative to the negative portion of the AC input voltage.
- Unit outputs 12V and 18V to power the ozone monitor.
- User can change the 10 LED indicator lamps from their normal operation which indicates what mode/level the unit is currently set at, to a 10 bar display which will indicate the level of ozone currently being read by the ozone analyzer.
- 8-bit 20MHz Microcontroller.

- Microprocessor will shut both lamps down if the air flow drops too low, indicating the HVAC system is off. This saves power.
- Microprocessor has a two year timer to alert the user when service of the unit is necessary.
- Manual Mode – In this mode the unit does not take in a signal from an ozone monitor. The user, by pushing the button either on the unit or the remote, can set the unit into low, medium, high, and boost level. Boost level sets the ozone lamp at 100% output, High 75%, Medium 50%, and since the lamp can not be safely dimmed below 50%, low cycles the lamp on at 50% intensity and off every few minutes to achieve an average 25% output. When dimming to 50% intensity, the microcontroller actively finds the dimmest possible running state (~50% ozone output) given the environmental conditions (Air temperature, air speed, etc.). When dimming to 75% intensity the microcontroller first finds the 50% level given the environmental conditions then calculates the required dimming level to achieve 75% intensity.
- Continuous Signal Monitor Mode – In this mode the unit takes in either a 4-20mA signal or a 0-5V continuous signal. Low corresponds to 0.03 ppm, medium corresponds to 0.05 ppm, high corresponds to 0.08 ppm. The unit reads the current ozone level provided by the ozone monitor and then continuously increases or decreases the ozone output to maintain the desired ozone output. As the load on the ozone increases, the amount of ozone in the air decreases and the COMAir20T will increase the ozone production. If the lamp is dimmed to its minimum level and three consecutive readings measure an ozone level above the desired threshold, the ozone lamp is turned off until the measured ozone output falls below the desired level. Boost mode is achieved by holding the button down, after a few seconds the unit enters boost mode and puts the ozone lamp on 100% output. It will remain in this mode for 30 minutes before returning to the previous setting.
- Relay Signal Monitor Mode – In this mode the unit takes in a relay signal from an ozone monitor. The desired ozone level is set on the monitor itself. When the measurement is above the desired level the switch opens, and when the measurement is below the desired level the switch closes. Our unit actively seeks this level, when the microcontroller senses that the switch is closed it will slowly increase the ozone output until the switch closes at which point it will slowly decrease the ozone output. If the lamp is dimmed as low as it can go and the switch is still open then the microcontroller will shut the ozone lamp down until the switch opens. Boost mode is achieved by holding the button down, after a few seconds the unit enters boost mode and puts the ozone lamp on 100% output. It will remain in this mode for 30 minutes before returning to actively seeking the threshold level.
- Remote Control uses standard 8 strand network cable.
- Main control circuitry and ballast board completely isolated from remote control making them immune to noise regardless of cable length.
- Remote has all of the function as the cover (all indicator lights, and mode select button) allowing complete control of the unit from a remote location.
- Remote is powered off the main unit, no battery or auxiliary power necessary.
- Stainless Steel Chassis.
- Two Patents.

**OptiPure, a division of AQUION**  
 2605 Technology Dr., Bldg 300 Plano, TX 75074  
 p: 972.881.9797; f: 972.422.6262  
 e: info@optipure.net [www.optipurewater.com](http://www.optipurewater.com)