

Professional Ozone Generator

ONY10-3 and ONY20-3

Instructions for assembly and use. Revision 5.



Limited Warranty for Ozone equipment delivered by INFUSER

For the warranty to apply, the ozone equipment must have been installed according to instructions in the equipment's manual.

The manual is attached to the delivery and can also be downloaded from www.o3-technology.com

A new product is warranted to function for a period of 1 years or 5000 hours (which is reached first) from date of manufacture. INFUSER or its representatives must be informed of any complaint without delay.

The generator includes components that wear out during operation and that must be checked and replaced during maintenance service. These are counted as consumable items and are not covered by the limited warranty. For components that are replaced by the maintenance service (see manual), INFUSER leaves 3 months warranty from the date of exchange.

The limited warranty for a new product covers repair or replacement of the damaged part and labour costs. Original packaging should be retained if possible to facilitate a return shipping. Travel costs may be charged.

The limited warranty for a replaced spare part covers repair or replacement of the damaged part, and does not include labour costs, travel or other expenses in connection with the repair/ replacement of the part. Compensation is not granted for repairs made by anybody else than INFUSER's staff or its representatives without the written consent.

If damage occurs during transportation, the damage must be documented and reported promptly to the transportation company and INFUSER or its representative within a week.

This limited warranty does not cover damage caused by accidents, lightning, conducted noise, product changes, misuse or improper installation beyond the control of INFUSER.

Guarantee

For the Guarantee to apply, three requirements must all be met:

1- Installation

For the guarantee to apply, the ozone equipment must have been installed according to instructions in the equipment's manual. The manual is attached to the delivery.

2- Surrounding environment

For the guarantee to apply, the ozone equipment must operate according to instructions in the equipment's manual. The manual is attached to the delivery. The air quality (humidity, temperature) of the surrounding area should be carefully assessed by the installer. Failures due to a bad environment of operation won't be covered by the guarantee.

3- Service

For the guarantee to apply, the ozone equipment must be serviced as advised by INFUSER/ O3 technology. The generator includes components that wear out during operation and that must be checked and replaced to assure optimal efficiency of the device. These are counted as consumable items and are not covered by the limited warranty. The maintenance service has to be made every 2.500 hours. A device exceeding 2.800 hours of operation without service can't be covered by the Guarantee.

CE

ONY has been manufactured according to the following directions:

Electromagnetic Compatibility Directive (2004/108/EG)

Low Voltage Directive (2006/95/EC)

Machine Directive AFS 2008:3 (2006/42/EG)

Contents

Contents: Approx. 25 % stainless steel, 10 % electronical parts and 65 % machine parts.



ONY

The ONY-10 and ONY-20 ozone generators are a generation of advanced ozone generators built using the latest in ozone generator technology. The generators are identical apart from their electronics and power board for ozone production, with the ONY-10 being dimensioned for 10 grams of ozone per hour and the ONY-20 rated for 20 grams of ozone per hour. The generators feature robust construction, high capacity and low operating costs.

General description

Ozone is generated in a corona discharge that occurs when oxygen from the built-in oxygen generator passes a high voltage field with a frequency of 20-30 kHz. Electrons with high energy split up some of the oxygen molecules into oxygen atoms, which reacts with oxygen and forms ozone (O₃), a molecule with three oxygen atoms. The result is a gas mixture with up to 10 % ozone.

Ozone

Ozone (O₃) is a special form of oxygen. The gas has three oxygen atoms per molecule and is one of the most powerful oxidizing agents in existence. The ozone molecule breaks down into a diatomic oxygen molecule (O₂) and a single oxygen atom (O). The free oxygen atom is extremely reactive and quickly attacks anything nearby that has a propensity to oxidize. This oxidizing ability is used to eliminate odours, bacteria and viruses.

Ozone has a characteristic chlorine-like smell that is already noticeable at 0.01 ppm. The gas is toxic and high concentrations can cause irritation of the eyes and airways. The amount of ozone produced is easily controlled with the help of a sensor whose alarm signal shuts down the ozone generator if the acceptable limit is exceeded.

Areas of use

The ONY10-3 and ONY20-3 ozone generators are used in situations where there is a need for a high ozone concentration and a compact format. Examples of areas of use include catering in order to reduce cooking odors and grease in the kitchen flue, apartment blocks in order to get rid of unwanted odors that are spread via the ventilation system due to leakage in rotating heat exchangers, and on-board ships in order to eliminate odors from grey and black water tanks.

Checking the delivery

Check that the generator is undamaged after transportation. Contact the freight company in case of transport damage.

In addition to the ozone generator itself, the delivery always includes brackets for wall mounting and a handle for opening the door.

Transport

When receiving your ozone generator, store the transport package and the protective foam for future purpose.

Any transportation of the ozone generator requires safety precaution to protect the chassis and components inside.

- Secure the compressor with a strap to tie it down to the stand plate, the compressor is placed on vibration isolators and could therefore create movement during transport damaging other components within the unit.
- Clearly mark what is up and what is down inside on the transport package.
- To prevent rough handling, label the package with fragile sticker or notifying label.
- Secure the unit with extra vibration dampening material if feeling uncertain.
- For additional transportation instructions please contact your local sales representative.

Safety instructions

Read the user instructions carefully before operating the ozone generator. The unit contains electrical components and may therefore NOT come into contact with water and may NEVER be washed. Shut off the power during any service and maintenance work, the cabinet contains components with high voltage.



Disconnect mains before opening.
Please note that ozone is a toxic gas and that high concentrations can cause irritation of the eyes and airways.
The maximum level of 0.3 ppm (0.6 mg/m³) is the hygienically-acceptable limit for exposure during a reference period of 15 minutes.
A level of 0.1 ppm (0.2 mg/m³) is the hygienically-acceptable limit for exposure during a whole working day (8 hours).
The generally-accepted levels for ozone can vary from country to country.

Components

The ONY10 and ONY20-ozone generators are delivered with electronics and power board for ozone production rated for 10 (ONY10) or 20 (ONY20) grams of ozone per hour. All other components are identical for both models.

The electrodes

The heart of the ONY generators is the actual ozone production, in other words the electrodes. They consist of a smooth dielectric ceramic plate with wire mesh electrode attached to a power board with a generator that delivers approx. 4,000 volts. The corona frequency is 20-30 kHz. During the production of ozone the ceramic plate generates a considerable amount of heat. Heat sinks are positioned on both sides of the ceramic plate in order to reduce the temperature. A fan blows fresh air over the electronics board and through the heat sinks when the generator is operating. The ONY generators offer adjustable ozone production in two steps, 50% and 100%.



Cooling

A functional cooling system is vital for effective ozone production. Ozone naturally converts back to oxygen, and the reversion process is accelerated at higher temperatures. The heat from the corona discharge is removed using heat sinks and a fan that is positioned at one end of the ozone generator. This must have access to cold, clean air. Place the generator in as cool a location as possible.

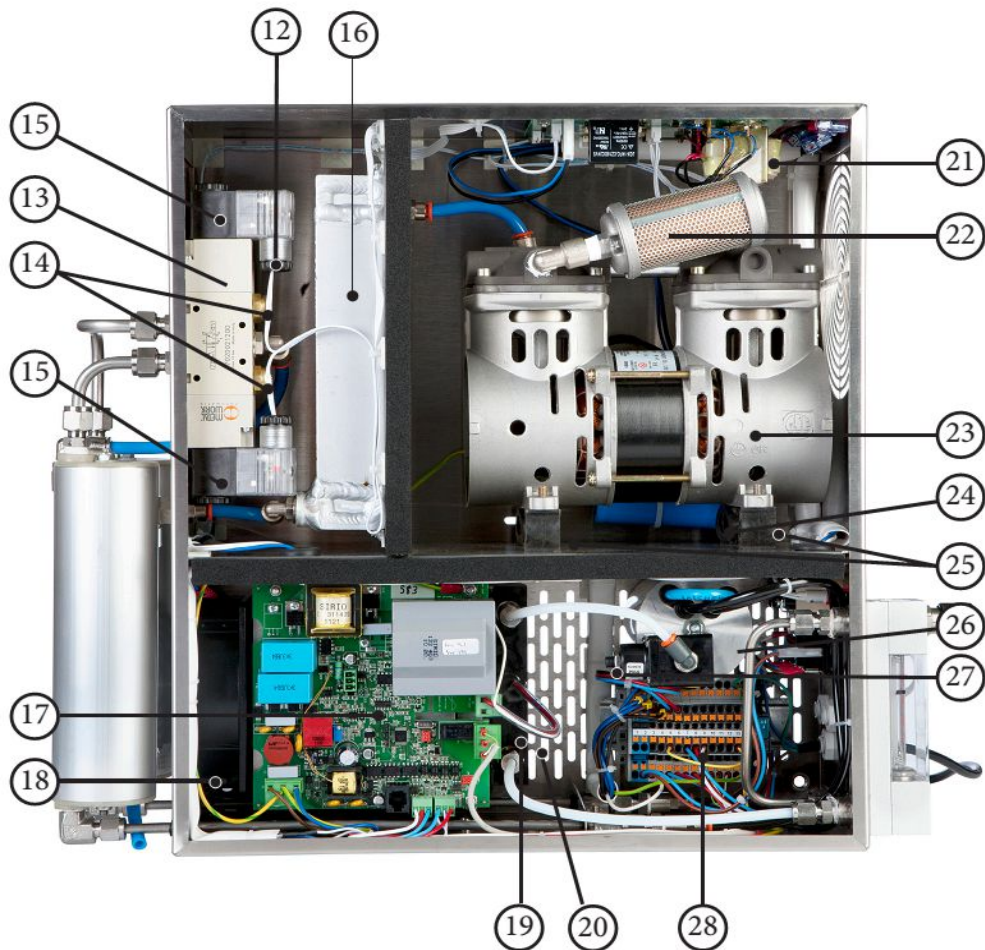


Oxygen

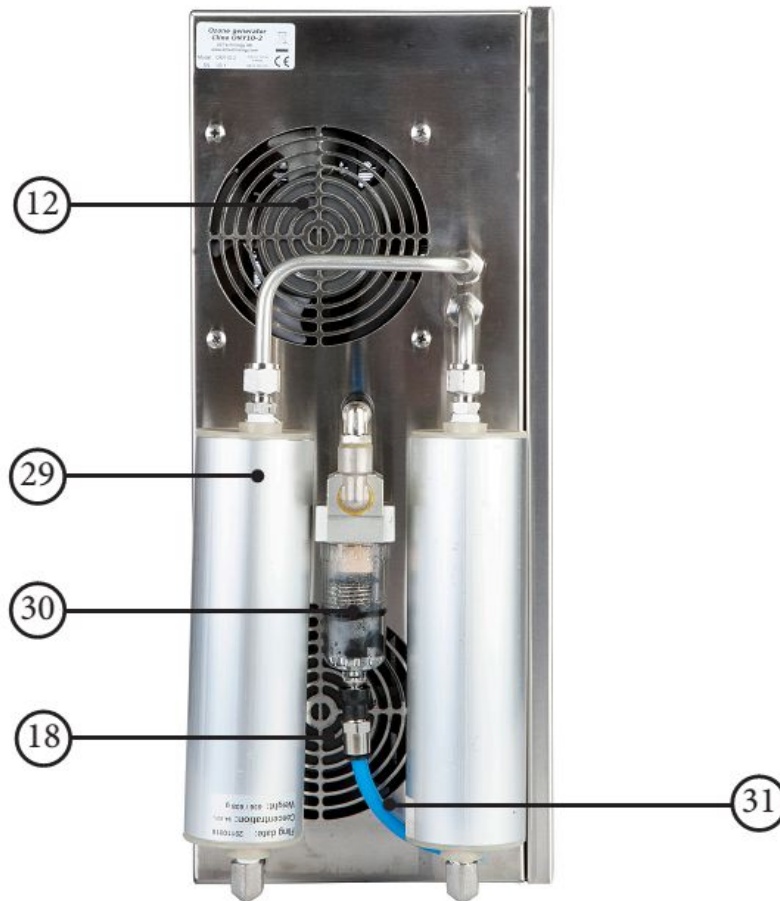
The ONY generators have a built-in oxygen concentrator of the PSA (pressure swing adsorption) type. This is tried and tested, reliable and environmentally-friendly technology that is also very efficient. The only raw material required is air. The technology is based on the air being pumped through a filter bed containing aluminosilicate minerals, or zeolites, that adsorb nitrogen but allow oxygen to pass freely. The zeolites quickly become saturated which is why double filter beds are required. When the first bed becomes full with nitrogen the air current switches to the other bed in order to allow the first bed to regenerate. The nitrogen is pushed out through the valve system at the same time that the second bed produces oxygen. The switching between the two filter beds occurs totally automatically. The oxygen that is feed to the ceramic plate is at least 90% pure.



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| <ul style="list-style-type: none"> 1. Power switch ON/Off 2. Operation indicator ozone 3. Control 50%/100 % ozone output /EXT 4. Operation indicator oxygen 5. Connection for sensor 6. Operating time counter 7. Ozone output connection 8. Flow meter oxygen 9. Needle valve outgoing gas flow 10. Mains connection 11. Extra cable input | <ul style="list-style-type: none"> 12. Cooling fan for compressor 13. Solenoid valve to the oxygen filter 14. Silencer for solenoid valve 15. Solenoid (x 2) 16. Air cooler 17. Power board for ozone production 18. Cooling fan ozone 19. Ceramic plate 20. Heat sinks x 2 21. Controller board oxygen 22. Air filter for intake air 23. Compressor 24. Capacitor 25. Vibration reducers x 4 26. Oxygen tank 27. Pressure regulator for outgoing 28. Terminal block 29. Oxygen filter 30. Water separator 31. Water drainage |
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| 1. Power switch ON/Off | 17. Power board for ozone production |
| 2. Operation indicator ozone | 18. Cooling fan ozone |
| 3. Control 50%/100 % ozone output /EXT | 19. Dielectric ceramic plate |
| 4. Operation indicator oxygen | 20. Heat sinks x 2 |
| 5. Connection for sensor | 21. Controller board oxygen |
| 6. Operating time counter | 22. Air filter for intake air |
| 7. Ozone output connection | 23. Compressor |
| 8. Flow meter oxygen | 24. Capacitor |
| 9. Needle valve outgoing gas flow | 25. Vibration reducers x 4 |
| 10. Mains connection | 26. Oxygen tank |
| 11. Extra cable input | 27. Pressure regulator for outgoing |
| 12. Cooling fan for compressor | 28. Terminal block |
| 13. Solenoid valve to the oxygen filter | 29. Oxygen filter |
| 14. Silencer for solenoid valve | 30. Water separator |
| 15. Solenoid (x 2) | 31. Water drainage |
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Installation and commissioning

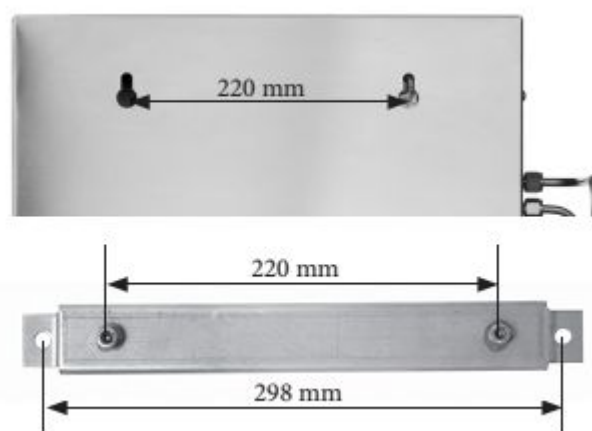
Choosing a suitable location

For the best possible functionality, the location of the generator should be chosen with the utmost care and attention. It should be cool, clean and dry, without too much dust. Please note that the ozone generator uses the air from the surrounding area. The best location is in an air-conditioned space or in a storage room. The temperature should be somewhere in the range $-10\text{ }^{\circ}\text{C}$ to $+30\text{ }^{\circ}\text{C}$. The optimal temperature is between $5 - 15\text{ }^{\circ}\text{C}$. The production of ozone reduces at higher temperatures. The rate of reduction is approx. $0.3\text{ g}/^{\circ}\text{C}$.

The generator contains electrical components and might NOT come into contact with water and should NEVER be washed. Avoid locations that are humid. At high levels of humidity the filter material in the oxygen filters is broken down and eventually the filters cease to function.

Positioning the generator

Identify a good place for the generator considering where the ozone is to be supplied (it may not be transported more than 25 m) and where there is a supply of electricity 230V, 50Hz. Ensure that the cooling fans have access to clean air that is free from dust and particles. The generator should be placed as cool as possible. Drill two 8 mm holes horizontally with c/c 298 mm and screw in the wall rail that is supplied. Hang up the generator. Remember the weight of the generator, 21 kg. Always adhere to any local regulations concerning electric installation and piping.



The tube for the supply of ozone

Attach the PTFE tube (for instance Teflon) in the generator's needle valve for outgoing gas flow 9 and install the tube to a suitable place where ozone is to be supplied. Attach any partitions/T-connectors as appropriate. We recommend an adhesive tube as protection, either plastic or metal.

Electricity

Attach the power cable to 230V, 50 Hz via a wall socket or perform a fixed installation. Please note that the generator should always be in receipt of power.

Sensor C30ZX & L101 (optional)

It's highly recommended that a safety sensor is connected for automatic shut-off of the generator in the event of an unforeseen leakage. Always mount one sensor in the same area that the generator is located. If ozone is being supplied to an area potential containing people, a sensor should be mounted in that area as well. If ozone is being supplied to a kitchen duct, a sensor (channel sensor) should also be mounted in the flue. Acceptable limits for ozone are 0.1 or 0.3 ppm depending on the circumstances. Please see page 2 for more information.

Commission / starting the system

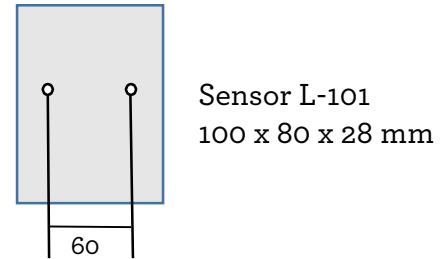
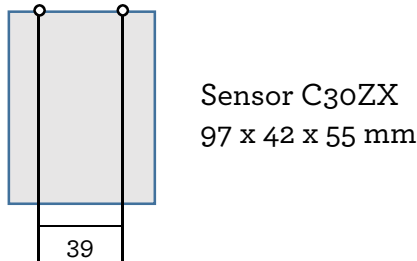
Start the generator via the power switch 1.

Check the flow of oxygen. The generator is calibrated for the correct amount of ozone when the ball is in the middle of the line on the flow meter for oxygen 8. Measure and check the ozone concentration.

Connections

Sensor L-101

Sensor L-101 has a cable with a bayonet connection that matches the sensor connection 5. Make sure that the connection tracks match up correctly. The sensor is pre-set for 0.1 ppm but can be adjusted to another value as required. Please refer to the separate factsheet for more information. Please note that the generator does not automatically restart if the prescribed ozone level is exceeded. It will need to be restarted manually in such cases.

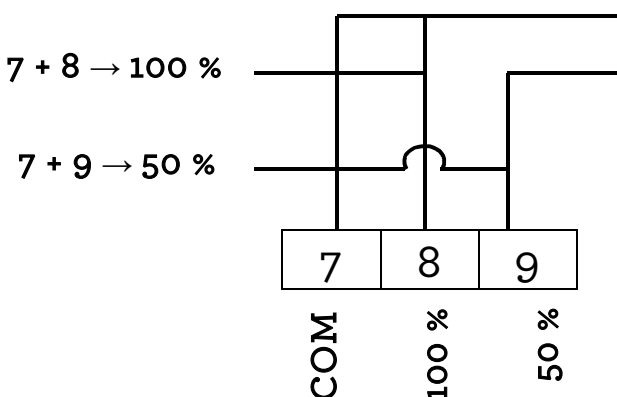


Remote control

The control is set to the EXT position when the generator is to be controlled externally, for instance through DUC or PLC. External control is possible for ozone production in three steps: 0%, 50% or 100%. Please refer to coupling below. Ports 7-12 in the terminal block 28 can be used for communication with and control of the ozone generator. Please be careful not to disturb hoses and cables during installation.

Control 0%/50%/100%

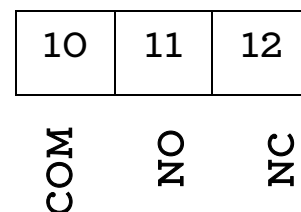
Terminal 7, 8 and 9 are used to control the amount of ozone that the generator produces when the control 3 is set to position EXT. Between port 7-8, 7-9 and 8-9 is 5V. It is strictly forbidden to add additional voltage to these ports, since it will damage the power board 17. 7 not connected 0%. Please note that the ozone generator shuts down completely when this setting is employed (the sensor is still active) and that there will be a delay before normal ozone production is achieved again.



External alarm

Terminal 10, 11 and 12 are used to enable the generator to communicate with DUC or PLC. The alarm signal is potential free and indicates either that the sensor has exceeded its allowable limit or that an internal fault has occurred on the power board 17.

It is optional whether the alarm signal is closed or open.



Removal

When removing the ozone generator from its installed location it is highly important to consider safety. The power must always be turned off before the door is opened.
Disconnect the power supply cable from the power source.
Disconnect the ozone output teflon hose 7.
Disconnect the ozone sensor cable 5.
Disconnect any remaining cables 10, 11 from the terminal block inside the ozone generator
For transport see the instruction on page 3 in this manual.

Service and maintenance

Please note that the ozone generator contains high voltage. The power must always be turned off before the door is opened.

Ongoing service

Service ensures correct operation and extends the life of the product.

Weekly checks

- Check that the flow meter for ozone 8 is displaying the correct level
- Check that the operation indicator for ozone 2 is lit up
- Check that the operation indicator for oxygen 4 is lit up
- Check the water drainage 31
- Check the time counter 6

After every 2,500 hours

- Change the air filter for intake air 22
- Check the water separator 31, a small amount of water should come out when the spring on the bottom is lifted
- Change the silencers on the solenoid valve 14
- Change the sintered metal filter and the tray at the bottom of the water separator 31

Troubleshooting

1- Problem: The generator has stopped

- If the generator has stopped because of the alarm then it must be restarted manually.
- Try switching the power switch 1 off and on. If the problem persists then please contact the supplier for information and instructions.

2 - Problem: The generator will not start

- Check that the generator is correctly attached to the mains.
- Check that the power switch 1 is set to position 1 and is lit up.
- Check the fuse. Push in the MCB 7 to reset it.
- The control 3 has a setting for external operation, EXT. When this setting is selected the generator is controlled by an external relay contact. If the control 3 is set to EXT and the generator will not start, it may mean that the start signal from the relay contact is not connected. This can be checked by setting the control 3 to position 50% or 100 %.
- If the generator starts in that position then the problem is most likely due to a fault with the relay contact.
- Check the outgoing gas pipe/Teflon hose for moisture or water. If water is discovered, please contact the supplier for information and instructions.

Contact the person responsible for the installation of the control.

3 – Problem: Both the operation indicator for oxygen 4 and the operation indicator for ozone 2 are lit up but no ozone is being produced.

- Check that the needle valve for outgoing gas flow 9 is open.
- Check that the ball in the flow meter for oxygen 8 is on the marker.
- Check that the water separator 31 is not clogged by pushing up the water drainage 33 and checking that air is flowing through. If not – change the sintered metal filter and the tray at the bottom of the water drainage 33.
- Dismantle the Teflon hose from the needle valve 9 and check whether or not gas is coming out.

CAUTION! There is a high concentration of ozone at the needle valve, do not smell/inhale in very close proximity to the needle valve.

If there is no ozone odour present then there could be something wrong with the oxygen production. There is an Ø 6 mm blue hose at the oxygen tank 26 that runs from coupling to coupling, and there is a restrictor in it! Ensure that the restrictor is always in place. Without it the oxygen generator will not function.

Check for leakage on the oxygen tubes 30, around the couplings as well as at the lid, top and bottom.

If the problem persists then it can most likely be alleviated by changing the oxygen filter 30 or the shuttle valve 13.

Contact the supplier for information and instructions. If the smell of ozone is present then the system after the ozone generator should be checked carefully for leakage, bent hoses or other jams or if a valve in the latter part of the system has stopped functioning.

4 - Problem: Smell of ozone

- A possible cause is leakage from a gas pipe, valve, coupling or connection. Check the couplings from the dielectric ceramic plate 19, both sides of the needle valve 9 and the Teflon hose output. -Check the pressure regulator for outgoing oxygen 27. Use leak spray but avoid any liquid coming into contact with electrical components. Retighten the couplings carefully and avoid over tightening them. The gas coupling on the dielectric ceramic plate 19 should only be retightened by a trained fitter.

5 - Problem: The flow meter for oxygen 8 is displaying a low reading

- Adjust/open the needle valve for outgoing gas flow 9.
- If the ball in the flow meter for oxygen 8 is vibrating, check the oxygen tubes 30 for possible leakage.
- Check that the water separator 31 is not clogged by pushing up the water drainage 33 and checking that air is flowing through. If not – change the sintered metal filter and the tray at the bottom of the water drainage 33.
- Close the needle valve 9 and check the flow meter 8. If the meter is not reset then there is a leak after the flow meter, otherwise the leak is before the flow meter. Check for leakage of oxygen inside, use leak spray but avoid any liquid coming into contact with electrical components.
- If the generator has been exposed to a lot of moisture then the oxygen filter 30 may have sustained damage.
- Remove the blue compressed air hose from the shuttle valve 13 and check for white powder in the hose. If white powder exists you should immediately contact the supplier for information and instructions.

Technical information

Ozone production	max 10 g/h (ONY-10) / max 20 g/h (ONY-20)
Ozone concentration	130 g/Nm ³
Ozone flow	max 3.0 l/min
Electricity	230V/50Hz
Mains cable	0.75 mm ²
Output	600 W
Fuse	6,0A
Dimensions (HxWxD)	450x540x205 mm
Weight	23 kg
Secondary voltage to the generator	4,000V / 25KHz
Warranty	1 year
IP-class	21
CE Approved	YES