



Astral™ series



Cleaning and maintenance

English

Cleaning and maintenance

The cleaning and maintenance described in this section should be carried out regularly.

Refer to the user guides for the patient interface, humidifier and other accessories in use for detailed instructions for care and maintenance of those devices.



WARNING

- A patient treated by mechanical ventilation is highly vulnerable to the risks of infection. Dirty or contaminated equipment is a potential source of infection. Clean the Astral device and its accessories regularly.
 - Always turn off and unplug the device before cleaning and be sure it is dry before plugging back in.
 - Do not immerse the device, pulse oximeter or power cord in water.
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The Astral device can be cleaned using an anti-bacterial solution on a clean, non-dyed disposable cloth. After replacing any accessory in the patient circuit, ResMed recommends you perform a Learn Circuit.



CAUTION

Clean only exterior surfaces of the Astral device.

The following cleaning solutions are compatible for use on a weekly basis (except as noted) when cleaning the external surfaces of the Astral device:

- Actichlor Plus
- Bleach (1:10) (May also be known as 'dilute hypochlorite').
- Isopropanol
- Cavicide*
- Mikrozid*

*Suitable for cleaning on a monthly basis only.

Single patient use

For all circuit components, follow the manufacturer's recommendations for cleaning and maintenance.

Weekly

1. Wipe the exterior of the device with a damp cloth using a mild cleaning solution.
2. Inspect the condition of the circuit adapter for entry of moisture or contaminants. Replace as necessary, or at regular intervals not less than once every six months.
3. Test the alarm sounders, refer to Testing the alarm sounders (see page 109).

Monthly

1. Inspect the condition of the air filter and check whether it is blocked by dirt or dust. With normal use, the air filter needs to be replaced every six months (or more often in a dusty environment).
2. Check the charge level of the internal battery by:
 - removing external power and operating the device on internal battery for a minimum of 10 minutes.
 - reviewing the remaining battery capacity, refer to Using the Internal battery (see page 63).
 - restoring external power once the test is complete.

Multi-patient use



WARNING

- To prevent the risk of cross-contamination, an antibacterial filter, placed on the inspiratory port is mandatory if the device is to be used on multiple patients as under some fault conditions, expired gas may be returned through the inspiratory port.
- The expiratory module, internal antibacterial filter, expiratory flow sensor and blue membrane come into contact with exhaled gases but do not form part of the inspiratory pathway.

In addition to the cleaning and maintenance instructions for single patient use, you must perform the following before the device is provided to a new patient.

Component	Cleaning/ Maintenance method
Device	Refer to Cleaning and maintenance (see page 130).
Double limb adapter (used with Double limb circuits)	For general hygiene the Double limb adapter should be replaced or protected with an antibacterial filter.
Mask	Masks should be reprocessed when used between patients. Refer to the User guide provided with the mask in use.
Patient circuits	Replace or sterilise. Refer to the manufacturer's recommended cleaning instructions.
Humidifier	Refer to the User Guide provided with the humidifier in use.
Internal battery	Check the charge level by removing the external power and operating the device on internal battery for a minimum of ten minutes. Review the remaining battery capacity and restore external power.

Replacing components

Replacing the air filter

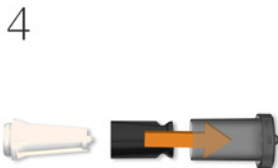
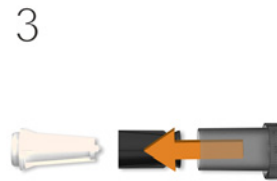
Inspect the condition of the air filter and check whether it is blocked by dirt or dust. With normal use, the air filter needs to be replaced every six months (or more often in a dusty environment).

CAUTION

Do not wash the air filter. The air filter is not washable or reusable.

To remove and replace the air filter

1. Unlock the air filter cover by turning in an anti-clockwise direction.
2. Pull the air filter cover from the device.
3. Pull the air filter from the cover and discard.
4. Insert a new filter into the cover.
5. Insert the air filter and cover back into the device.
6. Turn in a clockwise direction to secure in place.



Replacing the expiratory flow sensor and antibacterial filter (Astral 150 only)

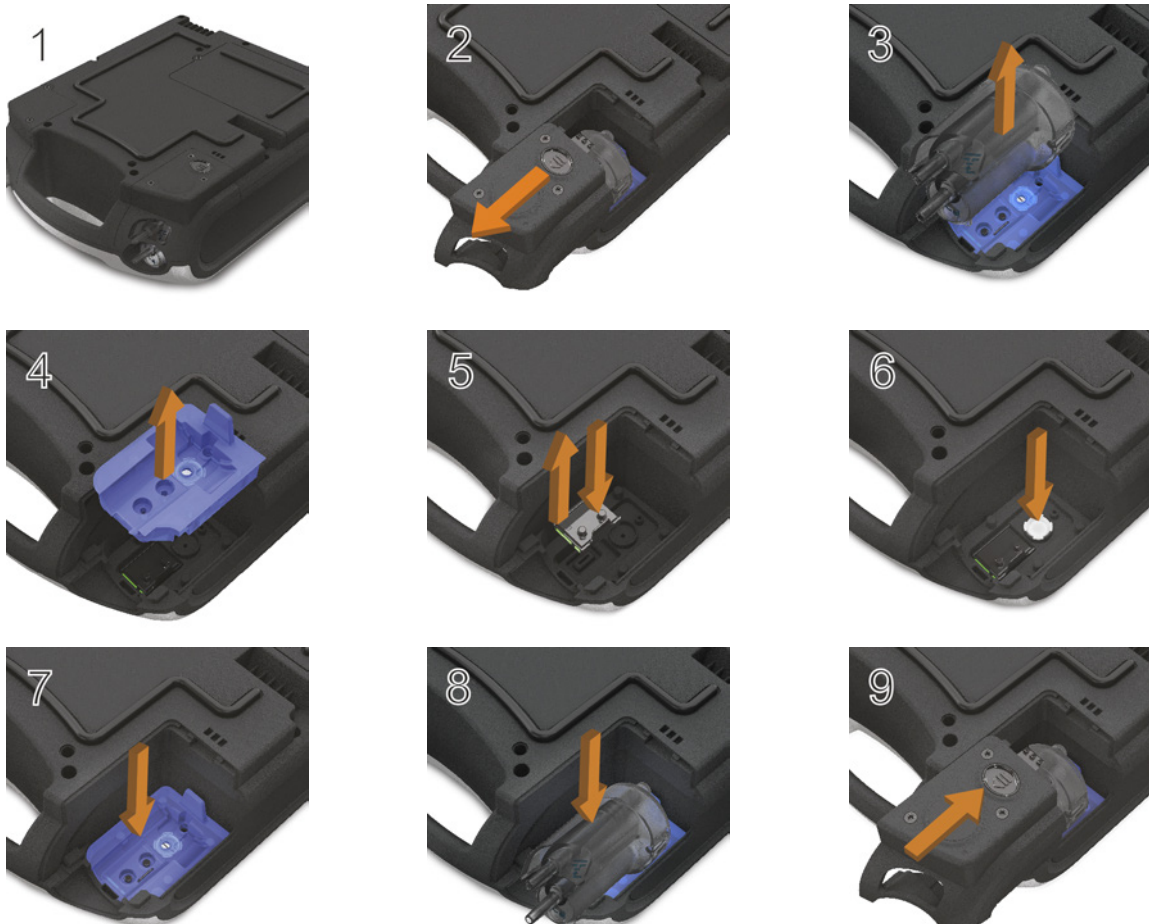
CAUTION

- Regularly check the double limb adapter (expiratory valve) for moisture and contaminants. Particular care should be taken when using nebulisers or humidifiers.
 - When replacing the expiratory flow sensor and antibacterial filter also replace the blue membrane and adapter.
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To remove and replace the expiratory flow sensor and antibacterial filter:

Before replacing the expiratory flow sensor, turn off the device and remove mains power and/or external battery.

1. Turn over the device and place on a soft surface (to protect the LCD screen).
2. Press and hold the eject button. Pull the cover out towards you.
3. Lift out the adapter and discard.
4. Remove the blue membrane (including the white antibacterial filter) and discard.
5. Remove and insert a new expiratory flow sensor.
6. Insert a new antibacterial filter.
7. Insert a new blue membrane ensuring the rear tab and surrounds sit flush in the enclosure.
8. Insert a new adapter, gently pushing down so it sits firmly in place.
9. Place the cover over the enclosure, ensuring the runners on the device and the cover are aligned. Slide the cover back into place until the latch clicks.



 **CAUTION**

Following the replacement of the Expiratory flow sensor, you must run a Learn Circuit to calibrate the new sensor and ensure accurate therapy and monitoring.

To calibrate the Expiratory flow sensor, connect a double limb circuit. Prior to performing the Learn Circuit, ensure double circuit is selected on the Circuit sub-menu.

Cleaning and maintenance

Replacing the double limb adapter (expiratory valve)

Regularly check the double limb adapter for moisture and contaminants. Replace as necessary using the procedure as described in [Connecting circuits](#).

Replacing the Oxygen sensor

To remove and replace the oxygen sensor (O₂ cell):

Before replacing the O₂ sensor, turn off the device and remove from mains power and/or external battery.

1. Unscrew the cover of the O₂ enclosure.
2. Remove the cover of the O₂ enclosure.
3. Holding on to the tab of the O₂ cell, gently pull the cell up and out of the enclosure. Gently pull the wire to remove it from the connector in the device.
The device is now ready for the new O₂ cell to be installed.
4. Carefully insert the connector of the new O₂ cell into the socket. This connector can only be inserted one way with the flat section to the wall of the enclosure. Press into place using a blunt tool (eg, a flat-bladed screwdriver).
5. Holding on to the tab of the O₂ cell, gently place the O₂ cell into the enclosure ensuring the wires are tucked into place.
6. Replace the cover and screw into place.



CAUTION

Following the replacement of the Oxygen sensor, you must run a Learn Circuit to calibrate the new sensor and ensure accurate therapy and monitoring.

Replacing the internal battery

WARNING

Turn off and disconnect oxygen before replacing the internal battery.

CAUTION

- Lithium-ion batteries have built-in safety protection circuits, but can still be dangerous if they are not used correctly. Damaged batteries can fail or catch fire.
- As the battery ages, the available capacity decreases. When the remaining battery capacity is low, do not rely on the internal battery as the primary power supply.
- Only recharge the internal battery inside the device or by using a ResMed approved charger. Avoid hard, physical impact on the device.
- Use the internal battery in accordance with the intended use stated in this guide. Damage to equipment or injury can result from modifying the equipment or its operation.
- The internal battery should be replaced every two years or sooner when there is a noticeable reduction in usage time when fully charged.

To remove and replace the internal battery:

Before replacing the internal battery, turn off the Astral device and remove from mains power.

1. Turn over the device and unscrew the battery cover.
2. Remove the battery cover from the device.
3. Remove the battery from the device.
4. Insert a new battery into the battery enclosure. Ensure the connectors on the battery sit face down into the enclosure against the battery connection points on the device.
5. Replace the battery cover.
6. Screw the battery cover securely in place.



Servicing



Inspection and repair should only be performed by an authorised agent. Under no circumstances should you attempt to service or repair the device yourself. Failure to do so could void your Astral device warranty, damage the Astral device or result in possible injury or death.

Note: Retain the original packaging of the Astral device for use when shipping to/from an authorised ResMed Service Centre.

Maintenance Timetable

The Astral device should be serviced by an authorised ResMed Service Centre according to the following schedule. The Astral device is intended to provide safe and reliable operation provided that it is operated and maintained in accordance with the instructions provided by ResMed. As with all electrical devices, if any irregularity becomes apparent, you should exercise caution and have the device inspected by an authorised ResMed Service Centre.

With regular servicing, the expected service life of an Astral device is 8 years.

Servicing schedule from the date of first use:

Recommended service interval	Conducted by	Instructions
Every six months	Personnel who have been trained in the use of Astral	Replacement of the air filter (replace earlier if dirty). Replacement of Single or Double limb circuit adapters if used.
Two years	Qualified technician	Two year Preventative maintenance. Replacement of the internal battery and FiO ₂ sensor if fitted.
35,000 hours	Qualified technician	Pneumatic block Preventative maintenance.

Helpful hint!

If Service Reminders are enabled you will get a notification on the device when two year preventative maintenance is nearly due.


Internal Battery

The expected life of the internal battery is two years. The internal battery should be replaced every two years or sooner when there is a noticeable reduction in usage time when fully charged. During storage ensure that internal battery is recharged once every six months.

Helpful hint!

If Service reminders are enabled you will get a notification on the device when there is a measurable reduction in battery usage time.

Device information

Device information, including the Next service due date indicating when the next preventative maintenance is due, can be found by pressing  and selecting Device.



Upgrading software

Software upgrades can only be performed by an authorised service representative. Astral has the ability to be upgraded with a USB stick containing the appropriate software. Please contact your authorised agent for further information.

Additional considerations for hospital or healthcare facilities

Component	Hospital or healthcare facility
Device	Follow the cleaning and maintenance protocol and schedule of the hospital/healthcare facility.
Double limb adapters	For general hygiene, the double limb adapter should be replaced between patients or protected with an antibacterial filter.
Air filter	Replace every six months (or more if necessary).
Mask	Masks should be reprocessed or replaced between patients. Cleaning, disinfection and sterilisation instructions are available from the ResMed website, www.resmed.com/downloads/masks . If you do not have internet access, please contact your ResMed representative.
Patient circuits	Follow the protocol of the hospital/healthcare facility and the recommendations of the manufacturer.
Humidifier	Follow the protocol of the hospital/healthcare facility and the recommendations of the manufacturer.
Antibacterial filter	Replace as required and between patients.