

# A SMARTER ALGORITHM ENSURES MORE EFFECTIVE THERAPY FOR EVERY PATIENT.



**OUR AUTO ALGORITHM GIVES YOUR PATIENTS A BETTER START EACH DAY. BECAUSE IT NEVER SLEEPS.**

## CLINICAL EXPERIENCE HAS SHOWN THAT PATIENTS SUFFERING FROM SEVERE OSA WILL STILL HAVE EPISODES OF OBSTRUCTIVE APNEAS ABOVE 10 CM H<sub>2</sub>O.

Physicians around the world have confidence in the REMstar Auto since it has the capability of managing patients who experience mild to severe OSA, while at the same time not increasing pressure on patients who may experience periods of central activity.

Other algorithms limit the treatment of apnea events above a fixed pressure level, resulting in under-treated patients. The REMstar Auto actually identifies when patients do not respond to pressure increases triggered by apneas or hypopneas.

If a persistent string of these events is detected, the device activates the Non-Responsive Apnea/Hypopnea (NRAH) logic, which limits pressure increases to 3 cm H<sub>2</sub>O. If at this time the patient continues to have events, the REMstar Auto will lower the pressure by 2 cm H<sub>2</sub>O and hold pressure for an extended period to stabilize the airway.

This pattern of increasing pressure, followed by subsequently decreasing pressure, allows the REMstar Auto to appropriately manage events that are non-responsive to increases in pressure. If the REMstar Auto identifies additional evidence that the events may be obstructive, such as snoring or hypopneas with flow-limited breaths, the REMstar Auto will temporarily override the NRAH logic and will increase pressure until the events are resolved. This safe and effective method is unique to the REMstar Auto, and each occurrence is noted in our enhanced Encore reporting as NRAH events.

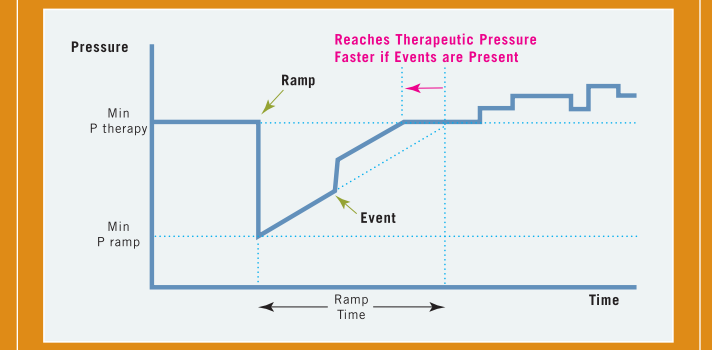
Having the ability to identify and react to Non-Responsive Apnea/Hypopnea events at higher pressures allows the REMstar Auto to successfully titrate obstructive apnea events above 10 cm H<sub>2</sub>O.

### OUR SMARTRAMP™ BRINGS A HIGHER LEVEL OF COMFORT TO YOUR PATIENTS.

The pressure needs of each patient are unique. With that in mind, the REMstar Auto was designed to provide the lowest pressure necessary to stabilize the airway. Even so, certain highly sensitive patients may still have difficulty falling asleep, even at a minimum therapy level.

Our solution is the proprietary SmartRamp feature. With the press of a button, patients can now manage the linear increase from the minimum ramp pressure to the minimum therapy pressure. Giving your patients the ability to customize their own ramp time significantly enhances their comfort.

Of course, if the patient falls asleep during this ramp time and events do occur, the algorithm will treat the events and continue to ramp up at the same rate, establishing the therapeutic minimum auto pressure faster.



### CLINICALLY VALIDATED

REMstar Auto with C-Flex is as effective as CPAP at abolishing sleep-related respiratory events

Mulgrew, A., et al., "Crossover Trial to Determine Efficacy and Patient Satisfaction with AutoCPAP with C-Flex versus Standard CPAP," *Sleep and Breathing* 2006. In press.

REMstar Auto significantly improves cognitive function to a level equal to or better than CPAP

Castronovo, V.E., et al., "Cognitive Functioning in Obstructive Sleep Apnea (OSA) Patients: Effect of AutoCPAP and Standard CPAP," *Sleep* 2006. Vol. 29, p. A213

### PATIENT PREFERRED

Patients express a preference for the REMstar Auto with C-Flex

Mulgrew, A., et al., "Crossover Trial to Determine Efficacy and Patient Satisfaction with AutoCPAP with C-Flex versus Standard CPAP," *Sleep and Breathing* 2006. In press.

The majority of patients prefer treatment with REMstar Auto versus CPAP

Nussbaumer, Y., et al., "Equivalence of Autoadjusted and Constant Continuous Positive Airway Pressure in Home Treatment of Sleep Apnea," *Chest* 2006. Vol. 129, pp. 638-643

REMstar Auto is the easiest to use, the quietest device, and the best value for the money

REMstar Auto provides the most restful sleep, the least problems for patients to go to sleep, and the least problems for patients to stay asleep

Nolan, G.M., et al., "Comparison of Three Auto-adjusting Positive Pressure Devices in Patients with Sleep Apnoea," *European Respiratory Journal* 2006. Vol. 28, pp. 159-164

### SUPERIOR PERFORMANCE

In a head-to-head comparison, the REMstar Auto provides better control of the RDI at consistently lower pressure levels throughout the night

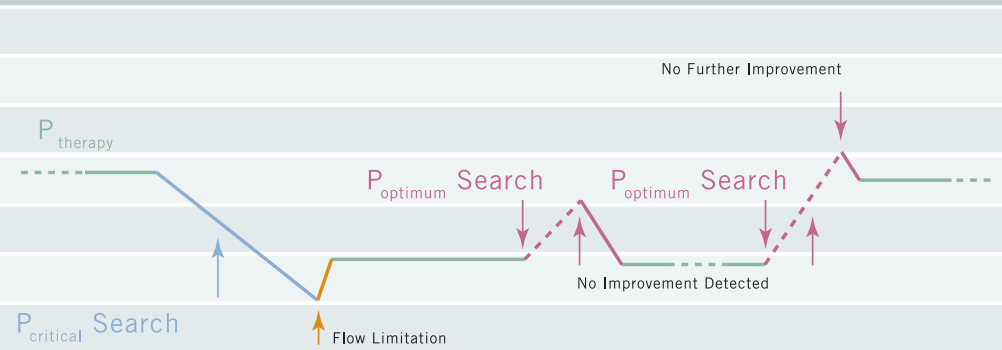
Hertegonne, K., et al., "Efficacy of Two Auto-CPAP Devices in Controlling Sleep Disordered Breathing," *European Respiratory Journal* 2005. Vol. 26, p. 1111S

REMstar Auto has the lowest effective mean pressure with the most hours of use per night

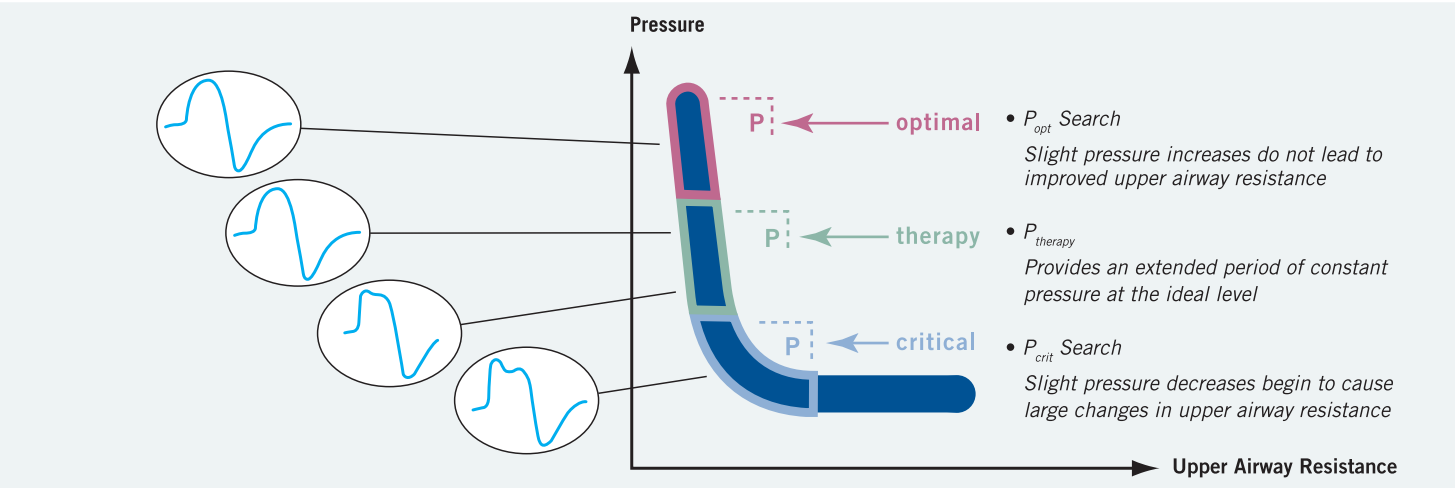
Nolan, G.M., et al., "Comparison of Three Auto-adjusting Positive Pressure Devices in Patients with Sleep Apnoea," *European Respiratory Journal* 2006. Vol. 28, pp. 159-164

REMstar Auto correctly detects and reacts to all types of respiratory events and prevents pressure increases during central events

Abdenbi, F., et al., "Bench Testing of Auto-Adjusting Positive Airway Pressure Devices," *European Respiratory Journal* 2004. Vol. 24, pp. 1-10



As the chart shows, the REMstar® Auto algorithm can determine the optimal therapy level by proactively performing two types of tests ( $P_{crit}$  and  $P_{opt}$ ). These tests not only help maintain pressure at a level in which obstruction is unlikely to occur, they also ensure that the pressure never becomes unnecessarily high.



What makes the REMstar Auto algorithm so different? Unlike other algorithms, the REMstar Auto can manage an event in the early stages rather than waiting for it to occur. Because small degrees of flow limitations are usually present before the onset of a complete obstruction or apnea, our algorithm is designed to proactively seek out these early indications and adjust pressure to resolve an event before it occurs.



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# THE RESPIRONICS® AUTO ALGORITHM IS SIMPLY A SMARTER CHOICE.

The Respiroics REMstar® Auto algorithm is a step ahead of other algorithms. It maintains optimal performance by continually searching for the appropriate pressure response, even in the presence of leaks. Our auto algorithm also gives you the flexibility to adapt to your patients' lifestyle changes, such as weight gain, weight loss, travel or changes in sleep schedule. And, as illustrated below, the innovative Respiroics Encore® Pro data management system gives you the power to develop patient reports, compare and analyze patients and track overall treatment progress.

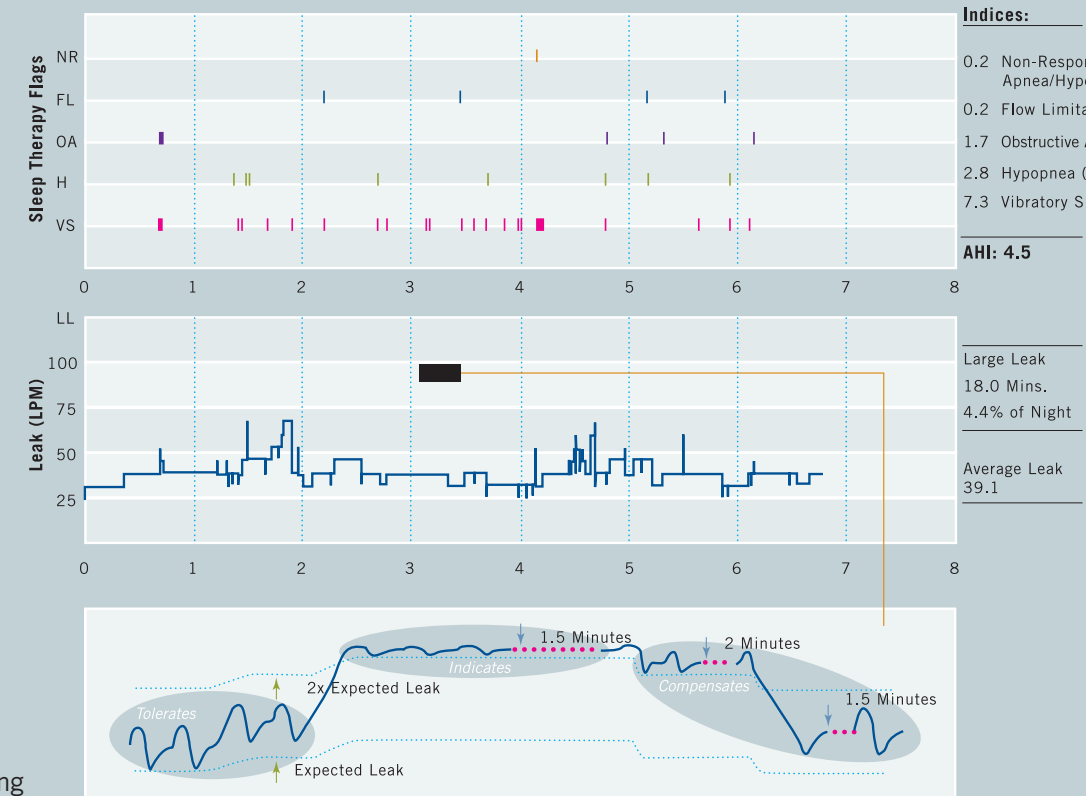


## Leak Management

Patient leak rate depends upon device pressure. For any given pressure level, the REMstar Auto algorithm compares the measured patient leak rate to an expected amount of leak from the exhalation device in the mask. The robust REMstar Auto algorithm **TOLERATES** a wide range of leak fluctuations.

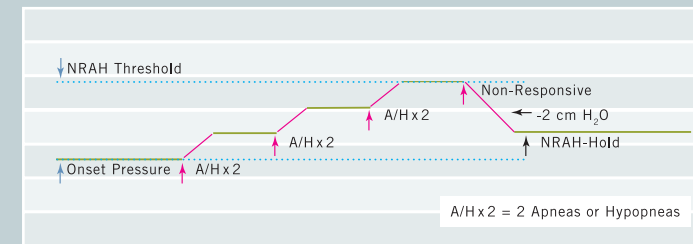
If the measured patient leak rate significantly increases above the expected leak for an extended period of time, the enhanced Encore report **INDICATES** this large leak by displaying a black bar.

Instead of falsely increasing pressure when a large leak is detected, our novel technology **COMPENSATES** by decreasing pressure in an attempt to re-seal the mask on the patient's face. It's safer for the patient and helps to provide uninterrupted sleep.



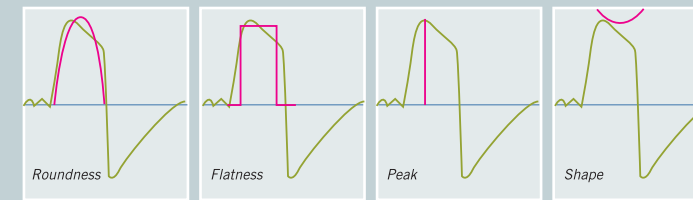
## Non-Responsive Apnea/Hypopnea

Events above 10 cm H<sub>2</sub>O are a common occurrence in non-responsive patients. But while other algorithms fail to respond to events above this level, the Respiroics auto algorithm has the ability to manage patients at this level – and higher.



## Flow Limitation

While other devices typically respond only to flatness and shape, our auto algorithm analyzes changes in flatness, roundness, peak and shape. This precise recognition of unique patient flow patterns is the reason why the REMstar Auto reacts better than any other device on the market.\*



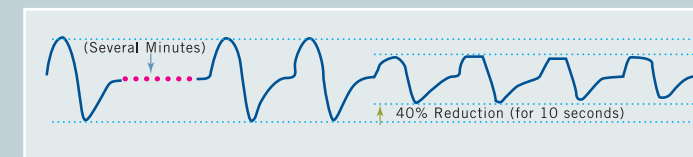
## Obstructive Apnea

Our auto algorithm establishes a baseline of patient flow based on a moving flow signal window. The REMstar Auto detects an apnea as an 80% reduction in flow lasting at least 10 seconds.



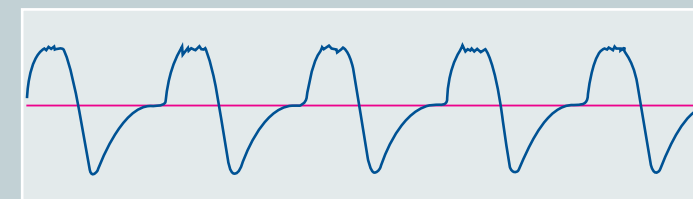
## Hypopnea

Our auto algorithm establishes a baseline of patient flow based on a moving flow signal window. The REMstar Auto detects a hypopnea as a 40% reduction in flow lasting at least 10 seconds, *followed by a recovery breath.*



## Snore

Snoring is a measure of partial airway occlusion and is a strong indicator of potential respiratory events. The REMstar Auto has the capability to detect snoring vibrations and adjust the pressure accordingly.



\*Abdenbi, F., et al., "Bench Testing of Auto-Adjusting Positive Airway Pressure Devices," *European Respiratory Journal* 2004, Vol. 24, pp. 1-10