



Script Conversion Guide



IMPORTANT: The comparisons presented are intended to serve only as a reference for clinicians, based on publicly-available user guides for competitor products (reference 1120832 04/2015, 1002159 06/2010, 1105933 01/2013, 1071073 12/2010). It may not reflect the most up-to-date information regarding competitive products from the manufacturer; therefore, please reference their current manufacturer user guides as needed.



Therapy Mode Conversion Recommendations

Scripted Therapy Mode	ResMed Therapy Mode	ResMed Therapy Device	HCPCS Coding
CPAP	CPAP	AirSense™ 10 Elite	E0601
APAP	AutoSet™	AirSense™ 10 AutoSet / AutoSet for Her	E0601
Bilevel	S	AirCurve™ 10 S	E0470
Bilevel	S	S9 VPAP™ COPD	E0470
Auto-Bilevel	VAuto	AirCurve™ 10 VAuto	E0470
T	T	AirCurve™ 10 ST / AirCurve™ 10 ST-A	E0471
ST	ST	AirCurve™ 10 ST / AirCurve™ 10 ST-A	E0471
ASV (with fixed EPAP)	ASV	AirCurve™ 10 ASV	E0471
ASV (with auto-EPAP)	ASVAuto	AirCurve™ 10 ASV	E0471
AVAPS	iVAPS	AirCurve™ 10 ST-A	E0471

Scripted Therapy Mode: CPAP

Mode	Philips	ResMed Recommended Setting		Mode
CPAP	DreamStation CPAP Pro	AirSense™ 10 Elite	Conversion Formula	CPAP
	CPAP (4–20 cm H ₂ O)	CPAP (4–20 cm H ₂ O)	CPAP = CPAP	
	Flex (C-Flex, C-Flex+, None)	EPR (Full Time, Ramp Only, Off)	EPR = Set to Full Time if C-Flex or C-Flex+ scripted; if not scripted, consider using to aid therapy comfort and acceptance, or set to Off	
	Flex Level (1, 2, 3)	EPR Level (1, 2, 3)	EPR Level = Flex Level	
	Ramp Time (0–45 mins, SmartRamp)	Ramp Time (0–45 mins, AutoRamp)	Ramp Time = Ramp Time	
	Ramp Start (4–[CPAP] cm H ₂ O)	Start Pressure (4–[CPAP] cm H ₂ O)	Start Pressure = Ramp Start	

Example				
CPAP	DreamStation CPAP Pro	AirSense™ 10 Elite	Conversion Formula	CPAP
	CPAP: 10.0 cm H ₂ O	CPAP: 10.0 cm H ₂ O	CPAP = CPAP	
	Flex: C-Flex+	EPR: Full Time	EPR = Flex	
	Flex Level: 3	EPR Level: 3	EPR Level = Flex Level	
	Ramp Time: 20 mins	Ramp Time: 20 mins	Ramp Time = Ramp Time	
	Ramp Start: 4.0	Start Pressure: 4.0	Start Pressure = Ramp Start	

HCPCS Coding	Description
E0601	CPAP devices

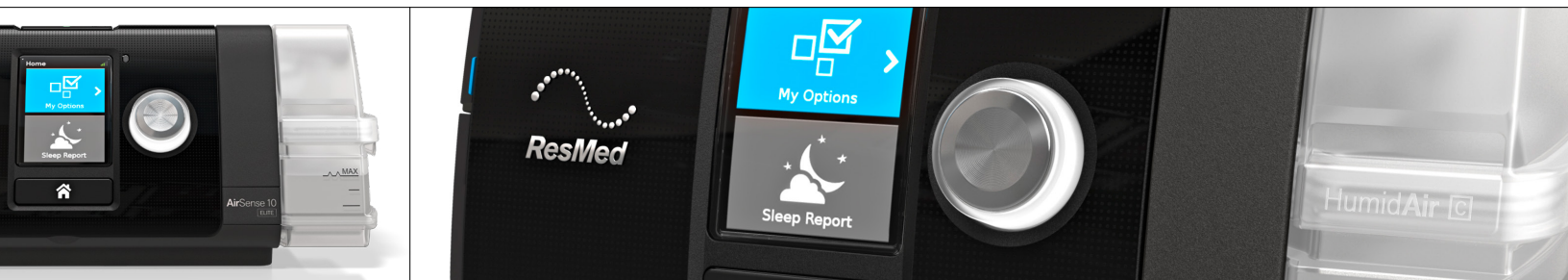
Scripted Therapy Mode: CPAP

EPR™

C-Flex and EPR™ are both pressure relief technologies. They lower pressure when your patient exhales so they can breathe more comfortably.

ResMed's EPR (expiratory pressure relief) uses the patented Easy-Breathe waveform. Easy-Breathe replicates the wave shape of normal breathing to deliver a smooth, natural breathing experience. EPR maintains optimal treatment for the patient during inhalation and reduces the delivered mask pressure during exhalation. Like C-Flex, EPR has three levels of pressure relief. However, unlike C-Flex,

ResMed's EPR is highly predictable with each setting corresponding to set pressure reduction. Setting 1 reduces pressure by 1 cm H₂O for mild relief, Setting 2 reduces pressure by 2 cm H₂O for moderate relief and Setting 3 reduces pressure by 3 cm H₂O for maximum pressure relief during exhalation. EPR can be set for use throughout the therapy session (Full Time) or during the ramp period only. Setting EPR to Ramp Only enables EPR as your patients are falling asleep, when they're generally more aware of the pressure. When the ramp period expires, pressure reverts comfortably to the prescribed CPAP level.



Scripted Therapy Mode: APAP

Mode	Philips	ResMed Recommended Setting		Mode
Auto	DreamStation Auto CPAP	AirSense™ 10 AutoSet / AutoSet for Her	Conversion Formula	AutoSet / AutoSet for Her Note: CPAP mode also available on device
	Auto Max (4–20 cm H ₂ O)	Max Pressure (4–20 cm H ₂ O)	Max Pressure = Auto Max	
	Auto Min (4–20 cm H ₂ O)	Min Pressure (4–20 cm H ₂ O)	Min Pressure = Auto Min	
	Flex (C-Flex, A-Flex, None)	EPR (Full Time, Ramp Only, Off)	EPR: Set to Full Time if C-Flex or A-Flex scripted; if not scripted, consider using to aid therapy comfort and acceptance, or set to Off	
	Flex Level (1, 2, 3)	EPR Level (1, 2, 3)	EPR Level = Flex Level	
	Ramp Time (0–45 mins, SmartRamp)	Ramp Time (0–45 mins, AutoRamp)	Ramp Time = Ramp Time	
	Ramp Start (4–[Auto Min] cm H ₂ O)	Start Pressure (4–[Min Pressure] cm H ₂ O)	Start Pressure = Ramp Start	

Example				
Auto	DreamStation Auto CPAP	AirSense™ 10 AutoSet / AutoSet for Her	Conversion Formula	AutoSet
	Auto Max: 20 cm H ₂ O	Max Pressure: 20 cm H ₂ O	Max Pressure = Auto Max	
	Auto Min: 4 cm H ₂ O	Min Pressure: 4 cm H ₂ O	Min Pressure = Auto Min	
	Flex Type: A-Flex	EPR: Full Time	EPR = Flex	
	Flex Level: 3	EPR Level: 3	EPR Level = Flex Level	
	Ramp Time: 20 mins	Ramp Time: 20 mins	Ramp Time = Ramp Time	
	Ramp Start: 4.0	Start Pressure: 4.0	Start Pressure = Ramp Start	

HCPCS Coding	Description
E0601	CPAP devices

Scripted Therapy Mode: APAP

EPR™

C-Flex, A-Flex and EPR are pressure relief technologies. They lower pressure when your patient exhales so that they can breathe more comfortably.

ResMed's EPR (expiratory pressure relief) uses the patented Easy-Breathe waveform. Easy-Breathe replicates the wave shape of normal breathing to deliver a smooth, natural breathing experience. Like C-Flex, EPR has three levels of pressure relief. However, unlike C-Flex and A-Flex, EPR is highly predictable with each setting corresponding to set pressure reduction. Setting 1

reduces pressure by 1 cm H₂O for mild relief, Setting 2 reduces pressure by 2 cm H₂O for moderate relief and Setting 3 reduces pressure by 3 cm H₂O for maximum pressure relief during exhalation. EPR can be set for use throughout the therapy session (Full Time) or during the ramp period only. Setting EPR to Ramp Only enables EPR as your patients are falling asleep, when they're generally more aware of the pressure. When the ramp period expires, device will start automatically adjusting pressure in response to changes in your patient's upper airway patency.

Auto and AutoSet™

Auto and AutoSet™ are therapy modes that automatically adjust pressure in response to changes in your patient's upper airway patency. Pressure is increased when upper airway instability is detected and reduced again after a time period without events. Unlike CPAP, this type of therapy (often referred to as APAP) allows for changes in your patient's pressure needs within a night and from night to night. Pressure needs can vary based on sleep position, alcohol consumption, seasonal allergies, weight gain or loss and other lifestyle changes.

ResMed's AutoSet mode adjusts pressure delivery to provide the lowest pressure required to keep your patient's airway open. The AutoSet algorithm continually monitors your patient's breathing, adjusting pressure breath by breath and responding immediately

to airway changes such as flow limitation, snoring and obstructive apneas. Flow limitation often precedes snoring and apneas, so by responding to flow limitation, AutoSet is able to preemptively treat apneic events and prevent more serious, subsequent events from occurring. Unlike some other APAP algorithms, AutoSet assesses the severity of the event and determines the best pressure, applying it comfortably. The algorithm also monitors and compensates for mask seal (unintentional) leak. Forced oscillation technique (FOT) is used by the algorithm to determine the state of the airway during apneas, allowing the device to differentiate between central and obstructive events. The apnea type is reported in the data recorded by the device, and pressure increases only occur if the apnea was determined to be obstructive.

AutoSet for Her

There is evidence to show that sleep apnea in women is different from sleep apnea in men.¹ Typically, women take longer to fall asleep and have greater flow limitations and more frequent arousals during sleep than men.² Women with OSA also tend to have fewer and shorter apneas or hypopneas, as well as a lower apnea-hypopnea index (AHI).³ With nearly 40% of newly diagnosed sleep apnea patients being women,⁴ it was important to develop the first therapy device specifically designed to meet their needs.

ResMed AirSense™ 10 AutoSet for Her is the first device that provides therapy tailored to respond to female-specific characteristics of sleep-disordered breathing. It works by

increasing sensitivity to flow limitation and optimizing the response to these events. By responding to each flow-limited breath, the algorithm helps provide comfortable therapy. The AirSense10 AutoSet for Her can be paired with the AirFit™ for Her mask series to provide a complete offering for women.

1 Lin CM, Davidson TM and Ancoli-Israel S. Gender differences in obstructive sleep apnea and treatment implications. *Sleep Med Rev* 2008. 12(6): 481-96

2 Valipour et al. Gender-related differences in symptoms of patients with suspected breathing disorders in sleep: a clinical population study using the sleep disorders questionnaire. *Sleep* 2007. 30(3): 312-9

3 O'Connor C, Thornlye KS and Hanly PJ. Gender differences in the polysomnographic features of obstructive sleep apnea. *Am J Respir Crit Care Med* 2000. 161(5): 1465-726

4 Medicare 5% sample & OptumInsight medical claims data, 2012

Scripted Therapy Mode: Bilevel

Mode	Philips	ResMed Recommended Setting		Mode
Bilevel	DreamStation BiPAP Pro	AirCurve™ 10 S	Conversion Formula	S Note: CPAP mode also available on device
	IPAP (4–25 cm H ₂ O)	IPAP (4–25 cm H ₂ O)	IPAP = IPAP	
	EPAP (4–25 cm H ₂ O)	EPAP (4–25 cm H ₂ O)	EPAP = EPAP	
	Flex (Bi-Flex®, None)	Easy-Breathe (On, Off)	Easy-Breathe: Set to On if Bi-Flex is scripted; if not scripted then consider using to aid therapy comfort and acceptance, or set to Off and select appropriate Rise Time for the patient	
	Flex Setting (1, 2, 3)			

Example

Bilevel	DreamStation BiPAP Pro	AirCurve™ 10 S	Conversion Formula	S
	IPAP: 17 cm H ₂ O	IPAP: 17 cm H ₂ O	IPAP = IPAP	
	EPAP: 12 cm H ₂ O	EPAP: 12 cm H ₂ O	EPAP = EPAP	
	Flex: Bi-Flex	Easy-Breathe: On	Easy-Breathe: Set to On if Bi-Flex is scripted	
	Bi-Flex (1, 2, 3): 2			

HCPCS Coding	Description
E0470	Bilevel device without a backup rate

Scripted Therapy Mode: Bilevel

Bilevel Devices Without a Backup Rate

Bilevel devices without a backup rate can be used to treat OSA in patients who are ineffectively treated with, or unable to tolerate, CPAP/APAP therapy, or those who require high therapy pressures to manage their upper airway patency (typically considered pressures higher than 15 cm H₂O). With the ability to independently control both inspiratory (IPAP) and expiratory (EPAP) pressures, these can be adjusted in the sleep lab so that upper airway instability is treated while achieving a comfortable exhalation pressure for your patient. EPAP is usually adjusted for obstructive apneas, and IPAP

for obstructive hypopneas and snoring. In patients who have shown intolerance to CPAP, the recommended initial titration settings for S mode are IPAP=CPAP setting and EPAP=[4 cm H₂O below IPAP].

These devices rely on the patient spontaneously breathing and therefore being able to trigger (beginning of inhalation) and cycle (beginning of exhalation) the device. The AirCurve 10 S device and mode name (S) refer to this spontaneous breathing.

Bi-Flex[®] and Easy-Breathe

Bi-Flex and Easy-Breathe are both comfort technologies that are offered as alternatives to the traditional square/ventilation waveform. Bi-Flex takes the traditional square waveform and softens both inspiration and expiration. Three Bi-Flex settings lower the pressure by increasing amounts at the beginning of expiration prior to returning to the EPAP level. ResMed's patented Easy-Breathe waveform replicates the wave shape of normal breathing to deliver a smooth, natural breathing experience. Easy-Breathe is designed for patients with normal lung mechanics and may be set to either On or Off. If Easy-

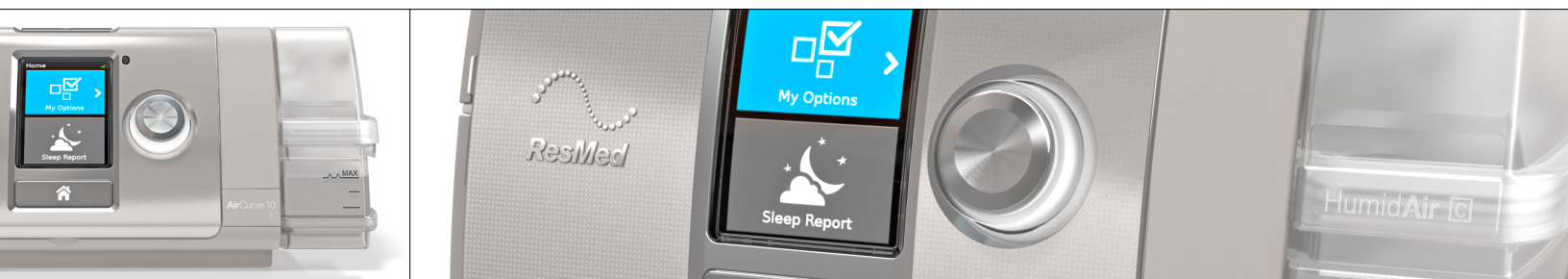
Breathe is disabled, a traditional square waveform is provided and the Rise Time setting can be used to adjust the rate at which pressure transitions from EPAP to IPAP. Rise Time may be adjusted for comfort or according to lung mechanics. A longer time would slow the transition and may be more comfortable for patients with normal lung mechanics or those who breathe slowly. Patients with high ventilatory demand may prefer a shorter Rise Time. Vsync, ResMed's automatic leak compensation algorithm, is used to reliably detect breaths to maintain synchrony with the patient's breathing and optimize comfort.

Inspiratory Time and Trigger and Cycle Sensitivities

ResMed's S therapy mode includes a number of secondary settings that can be used to fine-tune therapy for your patients. While default values should be appropriate for most patients, these technologies can be used to accommodate their *unique* needs.

TiControl™ provides minimum and maximum inspiratory time limits (Ti Min and Ti Max settings, respectively) for each breath. Ti Min and Ti Max can be used to prolong or limit, respectively, the time the device spends at IPAP. Along with Vsync, TiControl can ensure synchronization even in the presence of significant mouth and/or mask leak.

Adjustable trigger and cycle sensitivities can be used to optimize synchrony. The device triggers (initiates IPAP) and cycles (initiates EPAP) as it senses changes in patient flow. At higher sensitivity settings, smaller flow changes make it easier for the patient to trigger and cycle the device.



Scripted Therapy Mode: Bilevel

Mode	Philips	ResMed Recommended Setting		Mode
Bilevel	DreamStation BiPAP Pro	S9 VPAP™ COPD	Conversion Formula	S Note: CPAP mode also available on device
	IPAP (4–25 cm H ₂ O)	IPAP (4–30 cm H ₂ O)	IPAP = IPAP	
	EPAP (4–25 cm H ₂ O)	EPAP (3–25 cm H ₂ O)	EPAP = EPAP	
	Flex (Bi-Flex, None)		Default rise time has been optimized for COPD patients. Adjust the rise time as required to improve comfort and outcomes.	
	Flex Level (1, 2, 3)			

Example

Bilevel	DreamStation BiPAP Pro	S9 VPAP COPD	Conversion Formula	S
	IPAP: 17 cm H ₂ O	IPAP: 17 cm H ₂ O	IPAP = IPAP	
	EPAP: 12 cm H ₂ O	EPAP: 12 cm H ₂ O	EPAP = EPAP	
	Flex: Bi-Flex		Default rise time has been optimized for COPD patients. Adjust the rise time as required to improve comfort and outcomes.	
	Flex Level: 2			

HCPCS Coding	Description
E0470	Bilevel device without a backup rate

Scripted Therapy Mode: Bilevel

VPAP COPD

VPAP COPD is the first and only spontaneous bilevel device without a backup rate, designed and indicated to treat COPD. COPD patients who require NIV have specific needs to ensure optimal ventilation. These patients often have difficulty exhaling air, which can lead to gas trapping and hyperinflation. Maintaining synchrony and comfort for

these patients is critical in getting them compliant on their therapy. VPAP COPD's default settings make initial setup quick and easy. The fast rise time, high-cycle sensitivity and shortened Ti Max all contribute to minimizing hyperinflation and improve synchrony and comfort.

Inspiratory Time and Trigger and Cycle Sensitivities

ResMed's S therapy mode includes a number of secondary settings that can be used to fine-tune therapy for your patients. While default values should be appropriate for most patients, these technologies can be used to accommodate their *unique* needs.

TiControl™ provides minimum and maximum inspiratory time limits (Ti Min and Ti Max settings, respectively) for each breath. Ti Min and Ti Max can be used to prolong or limit, respectively, the time the device spends at IPAP. Along with Vsync, TiControl can ensure synchronization even in the presence of significant mouth and/or mask leak.

Adjustable trigger and cycle sensitivities can be used to optimize synchrony. The device triggers (initiates IPAP) and cycles (initiates EPAP) as it senses changes in patient flow. At higher sensitivity settings, smaller flow changes make it easier for the patient to trigger and cycle the device.



Scripted Therapy Mode: Auto-Bilevel

Mode	Philips	ResMed Recommended Setting		Mode
AutoB	DreamStation Auto BiPAP®	AirCurve™ 10 VAuto	Conversion Formula	VAuto Note: CPAP and S modes also available on device
	IPAP Max (4–25 cm H ₂ O)	Max IPAP (4–25 cm H ₂ O)	Max IPAP = IPAP Max	
	EPAP Min (4–25 cm H ₂ O)	Min EPAP (4–25 cm H ₂ O)	Min EPAP = EPAP Min	
	PS Min (0–8 cm H ₂ O)			
	PS Max (0–8 cm H ₂ O)	PS (0–10 cm H ₂ O)	Adjust PS for comfort; selected PS should not exceed Max PS and should ideally be 4 cm H ₂ O or greater to provide expiratory relief	
	Flex (Bi-Flex, None)			
	Flex Level (1, 2, 3)			

Example				
AutoB	DreamStation Auto BiPAP	AirCurve™ 10 VAuto	Conversion Formula	VAuto
	IPAP Max: 25 cm H ₂ O	Max IPAP: 25 cm H ₂ O	Max IPAP = IPAP Max	
	EPAP Min: 6 cm H ₂ O	Min EPAP: 6 cm H ₂ O	Min EPAP = EPAP Min	
	PS Min: 0			
	PS Max: 6	PS: 4 cm H ₂ O	Adjust PS for comfort; selected PS should not exceed Max PS and should ideally be 4 cm H ₂ O or greater to provide expiratory relief	
	Flex: Bi-Flex			
	Flex Level: 2			

HCPCS Coding	Description
E0470	Bilevel device without a backup rate

Scripted Therapy Mode: Auto-Bilevel

Bilevel Devices Without a Backup Rate

Bilevel devices without a backup rate can be used to treat OSA in patients who are ineffectively treated with, or unable to tolerate, CPAP/APAP therapy, or those who require high therapy pressures to manage their upper airway patency (typically considered pressures higher than 15 cm H₂O). In Spontaneous (S) mode, inspiratory (IPAP) and expiratory (EPAP) pressures are set, and the difference between the two pressures is known as Pressure Support (PS). The IPAP and EPAP are fixed values and are usually titrated, like CPAP, to resolve upper airway instability and keep the airway open. For auto-bilevels, such as the AirCurve 10 VAuto and Auto BiPAP, the pressures are automatically titrated by device algorithms to keep the upper airway open. The lower and upper pressures used by the algorithms can be controlled using the Min EPAP and Max IPAP settings. In ResMed's VAuto mode, a Pressure Support value is set according to what is most comfortable to the patient (a starting value of 4 cm H₂O is

commonly used) and is fixed for the night. The absolute IPAP and EPAP values are automatically adjusted by the algorithm, responding to snore, flow limitation and obstructive apneas. But the difference between the inspiratory and expiratory pressure remains consistent throughout the night. The auto-bilevel mode on the Auto BiPAP uses a range of pressure support values that are selected using the PS Min and PS Max settings. The algorithm automatically adjusts EPAP and IPAP separately with EPAP adjusted for snore and apnea, and IPAP adjusting for flow limitation and hypopneas.

Like standard, spontaneous (S) bilevel therapy, these auto-bilevel devices depend on a patient's ability to spontaneously breathing to trigger (beginning of inhalation) and cycle (beginning of exhalation) the device.

Bi-Flex[®] and Easy-Breathe

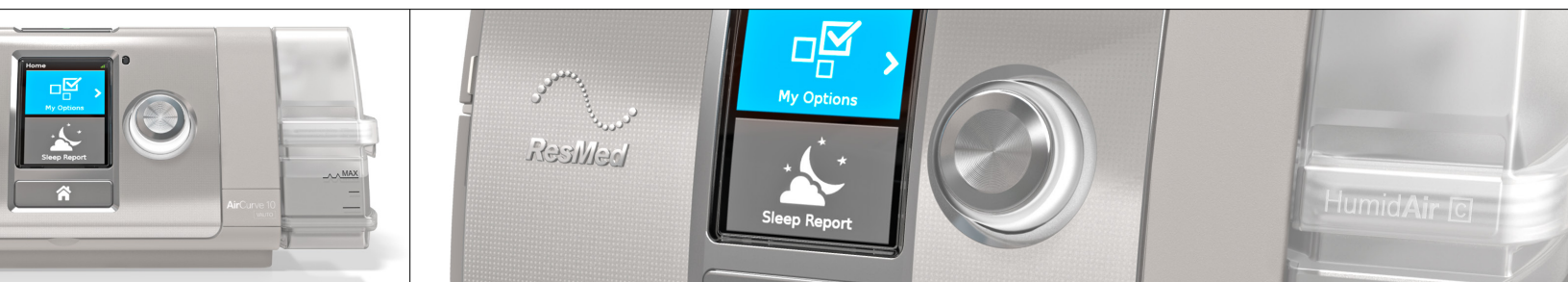
Bi-Flex and Easy-Breathe are both comfort technologies that are offered as alternatives to the traditional square, ventilation waveform. Bi-Flex takes the traditional square waveform and softens both inspiration and expiration. Three Bi-Flex settings lower the pressure by increasing amounts at the beginning of expiration prior to returning to the EPAP level. ResMed's VAuto mode uses the patented

Easy-Breathe waveform, which replicates the wave shape of normal breathing to deliver a smooth, natural breathing experience. Easy-Breathe is designed to be ultra comfortable for patients with normal lung mechanics. Vsync, ResMed's automatic leak compensation algorithm, is used to reliably detect breaths to maintain synchrony with the patient's breathing and optimize comfort.

Inspiratory Time and Trigger and Cycle Sensitivities

ResMed's VAuto therapy mode includes a number of secondary settings that can be used to fine-tune therapy for your patients. While default values should be appropriate for most patients, these technologies can be used to accommodate their *unique* needs. TiControl provides minimum and maximum inspiratory time limits (Ti Min and Ti Max settings, respectively) for each breath. Ti Min and Ti Max can be used to prolong or limit, respectively, the time the device spends at IPAP. Along with Vsync, TiControl can ensure synchronization even in the presence of significant mouth and/or mask leak.

Adjustable trigger and cycle sensitivities can be used to optimize synchrony. The device triggers (initiates IPAP) and cycles (initiates EPAP) as it senses changes in patient flow. At higher sensitivity settings, smaller flow changes make it easier for the patient to trigger and cycle the device.



Scripted Therapy Mode: T

Mode	Philips	ResMed Recommended Setting		Mode	
T	BiPAP® S/T	AirCurve™ ST / AirCurve 10 ST-A		T Note: CPAP and ST modes also available on device ST-A devices include CPAP, ST, T, PAC and iVAPS modes	
	IPAP (4–25 cm H ₂ O)	IPAP (4–25 cm H ₂ O) / IPAP (4–30 cm H ₂ O)			IPAP = IPAP
	EPAP (4–25 cm H ₂ O)	EPAP (4–25 cm H ₂ O) / EPAP (3–25 cm H ₂ O)			EPAP = EPAP
	Breath Rate (0–30 bpm)	Respiratory Rate (5–50 bpm)			Respiratory Rate = Breath Rate
	Ti (0.5–3.0 sec)	Ti (0.1–4.0 sec)			Ti = Ti
	Rise Time Control (Yes, No)				
	Rise Time (0–3 ms)	Rise Time (Min/100–900 ms)			Set Rise Time according to: 1 = 200 ms, 2 = 300 ms, 3 = 400 ms

Example					
T	BiPAP® S/T	AirCurve™ ST / AirCurve 10 ST-A		T	
	IPAP: 17 cm H ₂ O	IPAP: 17 cm H ₂ O			IPAP = IPAP
	EPAP: 12 cm H ₂ O	EPAP: 12 cm H ₂ O			EPAP = EPAP
	Breath Rate: 10	Respiratory Rate (RR): 10			
	Ti: 4 sec	Ti: 4 sec			Ti = Ti
	Rise Time Control: Yes				
	Rise Time: 2	Rise Time: 300 ms			

HCPCS Coding	Description
E0471	Bilevel device with a backup rate

Scripted Therapy Mode: T

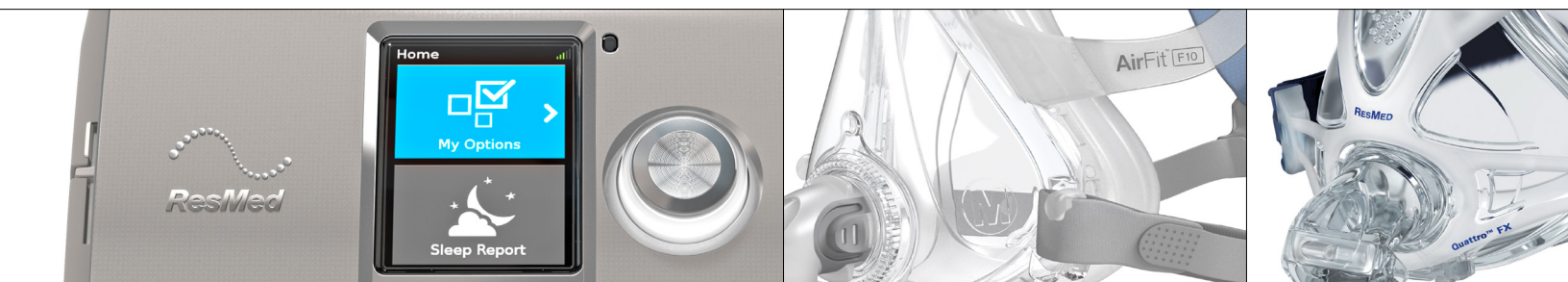
Bilevel Devices With a Backup Rate

The AirCurve™ 10 ST, AirCurve 10 ST-A and BiPAP S/T include a Timed (T) therapy mode. In T mode, devices provide a fixed breath rate and fixed inspiration expiration time regardless of patient effort.

Rise Time

The Rise Time setting adjusts the rate at which pressure transitions from EPAP to IPAP. Rise Time may be adjusted for comfort or according to lung mechanics. A longer time would slow the transition and may be more comfortable for patients with normal lung mechanics or those who breathe slowly. Patients with high ventilatory demand may prefer a shorter Rise Time. A typical Rise Time for a patient with normal lungs is 300 milliseconds (ms). Restrictive patients may also prefer a 300 ms Rise Time. Patients with

obstructive lung diseases may prefer faster Rise Times to fill their lungs quickly (potentially leaving more time for a prolonged exhalation to reduce air trapping). Rise Time should not be set longer than the patient's normal inspiratory time. On the BiPAP S/T, Rise Time settings are represented as a range (0, 1, 2, 3). On ResMed's AirCurve™ 10 ST AirCurve 10 ST-A, Rise Time settings are presented in milliseconds (ms) and adjusted in 50-ms increments.



Scripted Therapy Mode: S/T

Mode	Philips	ResMed Recommended Setting		Mode	
S/T	BiPAP® S/T	AirCurve™ 10 ST / AirCurve 10 ST-A		ST Note: CPAP, ST and T modes also available on device ST-A devices include CPAP, ST, T, PAC and iVAPS modes	
	IPAP (4–25 cm H ₂ O)	IPAP (4–25 cm H ₂ O) / IPAP (4–30 cm H ₂ O)			IPAP = IPAP
	EPAP (4–25 cm H ₂ O)	EPAP (4–25 cm H ₂ O) / EPAP (3–25 cm H ₂ O)			EPAP = EPAP
	Breath Rate (0–30 bpm)	Respiratory Rate (5–50 bpm)			Respiratory Rate = Breath Rate
	Rise Time Control (Yes, No)				
	Rise Time (0–3 ms)	Rise Time (Min/100–900 ms)			Set Rise Time according to: 1 = 200 ms, 2 = 300 ms, 3 = 400 ms

Example					
S/T	BiPAP® S/T	AirCurve™ 10 ST / AirCurve 10 ST-A		ST	
	IPAP: 17 cm H ₂ O	IPAP: 17 cm H ₂ O			IPAP = IPAP
	EPAP: 12 cm H ₂ O	EPAP: 12 cm H ₂ O			EPAP = EPAP
	Breath Rate: 10	Respiratory Rate (RR): 10			Respiratory Rate = Breath Rate
	Rise Time Control: Yes				
	Rise Time: 1	Rise Time: 200 ms			

HCPCS Coding	Description
E0471	Bilevel device with a backup rate

Scripted Therapy Mode: S/T

Bilevel Devices With a Backup Rate

The AirCurve™ 10 ST, AirCurve 10 ST-A and BiPAP S/T include both Timed (T) and Spontaneous/Timed (S/T) therapy modes. In S/T mode, the devices augment breaths initiated by the patient and will also supply additional breaths should the patient's breath rate fall below the set backup breath rate.

Inspiratory Time and Trigger and Cycle Sensitivities

ResMed's ST therapy mode includes a number of secondary settings that can be used to fine-tune therapy for your patient. While default values should be appropriate for most patients, these technologies can be used to accommodate their *unique* needs. TiControl provides minimum and maximum inspiratory time limits (Ti Min and Ti Max) for each breath. Ti Min and Ti Max can be used to prolong or limit, respectively, the time the device spends at IPAP. Along with Vsync, TiControl can ensure synchronization even in the presence of significant mouth and/or mask leak. Ti Max enables you to set a maximum inspiratory time to reduce the risk of intrinsic positive end-expiratory pressure (PEEP) and missed patient effort. Ti Min can be used to set a minimum inspiratory time to ensure adequate time for gas exchange without having to increase the pressure setting.

ResMed's ST therapy mode also includes adjustable trigger and cycle sensitivities, which can be used to optimize synchrony. The device triggers (initiates IPAP) and cycles (initiates EPAP) as it senses changes in patient flow. At higher sensitivity settings, smaller flow changes make it easier for the patient to trigger and cycle the device. Adjusting trigger sensitivity can support patients with a weak inspiratory effort by increasing sensitivity to every patient effort. Adjustable cycle sensitivity is crucial for those at risk for intrinsic PEEP or premature breath cycle. Setting a rapid rise time and high cycle sensitivity can help decrease the inspiratory time and extend the expiratory time, resulting in improved patient-ventilator synchrony for patients who are prone to intrinsic PEEP. A slower rise time and lower cycle sensitivity, along with an adequate Ti Min, ensure that patients with weak inspiratory effort have adequate time for gas exchange.



Scripted Therapy Mode: ASV (fixed EPAP)

Mode	Philips	ResMed	Conversion Formula	Mode
ASV fixed EPAP	BiPAP® AutoSV Advanced	AirCurve™ 10 ASV	Conversion Formula	ASV Note: CPAP and ASVAuto modes also available on device
	Max Pressure (4–25 cm H ₂ O)		Fixed at 25 cm H ₂ O	
	EPAP (4–25 cm H ₂ O)	EPAP (4–15 cm H ₂ O)	EPAP = EPAP	
	PS min (0–21 cm H ₂ O)	Min PS (0–6 cm H ₂ O)	Min PS = PS min	
	PS max (0–21 cm H ₂ O)	Max PS (5–20 cm H ₂ O)	Max PS = PS max	
	Breath Rate (Auto, 4–30 bpm)		Automatic: Dynamic backup rate built-in	
	Flex Type (None, Bi-Flex)		Automatic: Easy-Breathe waveform	
	Bi-Flex (1, 2, 3)		Automatic: Easy-Breathe waveform	
Rise Time (1, 2, 3)		Automatic: Easy-Breathe waveform		

Example

Mode	Philips	ResMed	Conversion Formula	Mode
ASV fixed EPAP	BiPAP® AutoSV Advanced	AirCurve™ 10 ASV	Conversion Formula	ASV
	Max Pressure: 25		Fixed at 25 cm H ₂ O	
	EPAP: 10	EPAP: 10	EPAP = EPAP	
	PS min: 0	Min PS: 0	Min PS = PS min	
	PS max: 13	Max PS: 13	Max PS = PS max	
	BPM: Auto		Automatic: Dynamic backup rate built-in	
	Flex Type: Bi-Flex		Automatic: Easy-Breathe waveform	
	Bi-Flex: 3		Automatic: Easy-Breathe waveform	
Rise Time: N/A		Automatic: Easy-Breathe waveform		

HCPCS Coding	Description
E0471	Bilevel device with a backup rate

Note: ASV therapy is contraindicated in patients with chronic, symptomatic heart failure (NYHA 2–4) with reduced left ventricular ejection fraction (LVEF ≤ 45%) and moderate to severe predominant central sleep apnea.

Scripted Therapy Mode: ASV (fixed EPAP)

ASV Therapy

In this context, the term ASV therapy is used to describe a therapy for treating central sleep apnea (CSA) in its various forms. However, ASV, or adaptive servo-ventilation, is actually a generic, descriptive term for the functioning of a control system (and is not specific to CSA at all). ASV devices work by creating an adaptive target, in this case based on the patient's breathing, and then adjusting a parameter, in this case pressure support, to meet that target.

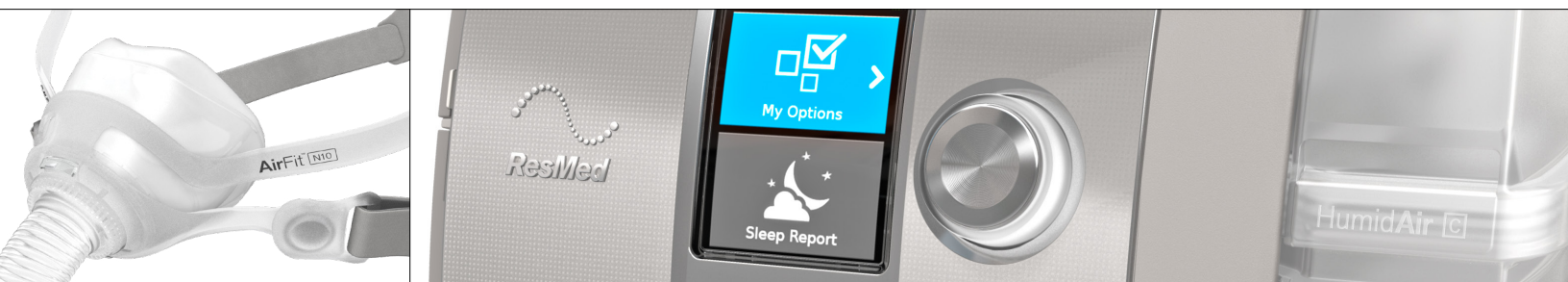
ResMed's unique ASV algorithm uses minute ventilation as the target since this is the most direct measure of patient breathing, enabling the most timely interventions to normalize breathing quickly. The algorithm continually monitors and learns the patient's recent minute ventilation (tidal volume x respiratory rate) and then sets a target at 90% of this value. The algorithm then automatically adjusts the pressure support to meet that target. Patients receive the minimum pressure support (a setting prescribed by the physician) whenever they're breathing at or above this target – such as would occur in normal breathing or hyperpnea (over-breathing). If the patient's instantaneous ventilation decreases away from the target, then pressure support is rapidly increased to bring ventilation back to the target. During this time, pressure support may be automatically increased up to the maximum pressure support value (as prescribed by the physician). In the absence of spontaneous effort, such as in a CSA event, the device inserts breaths at the patient's recent respiratory rate.

The auto-adjusting pressure support (the difference between inspiratory pressure) is provided on top of a manually adjusted EPAP in ResMed's original ASV therapy mode. The EPAP setting is titrated in a sleep lab to a value that keeps the patient's upper airway open (just like with a CPAP device). In ResMed's ASVAuto mode, EPAP is automatically adjusted by the device algorithm in response to flow limitation, snore and obstructive apneas in proportion to the severity of the events (like with ResMed's AutoSet therapy). This algorithm predicts the onset of airway collapse by detecting and assessing the flow shape of each breath, increasing EPAP in response to flow limitation, and detecting and responding to snoring. During obstructive events, instantaneous ventilation decreases away from the target and pressure support is increased in response. The algorithm monitors how minute ventilation responds to the increased pressure support, and if there is little or no flow during this period, it deduces that the airway is obstructed. Once breathing resumes, EPAP is increased to prevent the occurrence of further obstructive apneas. The EPAP range used by the algorithm can be restricted with the Min and Max EPAP settings. Once breathing is stabilized, EPAP gradually decreases towards the minimum EPAP setting, for comfort, over a 20- to 40-minute period depending on the type of event that occurred.

Bi-Flex® and Easy-Breathe

Bi-Flex and Easy-Breathe are both comfort technologies that are offered as alternatives to the traditional square, ventilation waveform. Bi-Flex takes the traditional square waveform and softens both inspiration and expiration. Three Bi-Flex settings lower the pressure by increasing amounts at the beginning of expiration prior to returning to the EPAP level. When Flex is set to Off, a traditional square waveform is used and a Rise Time setting is adjusted to determine how quickly the device moves from providing expiratory to inspiratory pressure. ResMed's ASV therapy uses the patented Easy-Breathe waveform, which replicates the wave shape of normal breathing to deliver a

smooth, natural breathing experience. Easy-Breathe is designed to be ultra comfortable for patients with normal lung mechanics. Comfort is further enhanced by the ASV algorithm's high-resolution breath-phase mapping, which learns both patients' respiratory rate and the rate at which they progress through each breath, dynamically predicting inspiratory and expiratory durations. This enables the device to deliver pressure that reaches its therapy peak at end-inspiration and its nadir by end-expiration continuously and smoothly. In addition to delivering optimal synchrony, this information is used to insert breaths at the patient's recent rate during apneas (when spontaneous effort ceases).



Scripted Therapy Mode: ASV (with auto-EPAP)

Mode	Philips	ResMed	Conversion Formula	Mode
ASV auto-EPAP	BiPAP® AutoSV Advanced	AirCurve™ 10 ASV	Conversion Formula	ASVAuto Note: CPAP and ASV modes also available on device
	Max Pressure (4–25 cm H ₂ O)		Fixed at 25 cm H ₂ O	
	EPAP min (4–25 cm H ₂ O)	Min EPAP (4–15 cm H ₂ O)	Min EPAP = EPAP min	
	EPAP max (4–25 cm H ₂ O)	Max EPAP (4–15 cm H ₂ O)	Max EPAP = EPAP max	
	PS min (0–26 cm H ₂ O)	Min PS (0–6 cm H ₂ O)	Min PS = PS min	
	PS max (0–26 cm H ₂ O)	Max PS (5–20cm H ₂ O)	Max PS = PS max	
	BPM (Auto, 4–30, Off)		Automatic: Dynamic backup rate built-in	
	Flex Type (None, Bi-Flex)		Automatic: Easy-Breathe waveform	
	Bi-Flex (1, 2, 3)		Automatic: Easy-Breathe waveform	
Rise Time (1, 2, 3)		Automatic: Easy-Breathe waveform		

Example				
ASV auto-EPAP	BiPAP® AutoSV Advanced	AirCurve™ 10 ASV	Conversion Formula	ASVAuto
	Max Pressure: 25	Automatic: Total maximum device pressure is 25 cm H ₂ O	Fixed at 25 cm H ₂ O	
	EPAP min: 5	Min EPAP: 5	Min EPAP = EPAP min	
	EPAP max: 12	Max EPAP: 12	Max EPAP = EPAP max	
	PS min: 0	Min PS: 0	Min PS = PS min	
	PS max: 13	Max PS: 13	Max PS = PS max	
	BPM: Auto		Automatic: Dynamic backup rate built-in	
	Flex Type: Bi-Flex		Automatic: Easy-Breathe waveform	
	Bi-Flex: 3		Automatic: Easy-Breathe waveform	
Rise Time: N/A		Automatic: Easy-Breathe waveform		

HCPCS Coding	Description
E0471	Bilevel device with a backup rate

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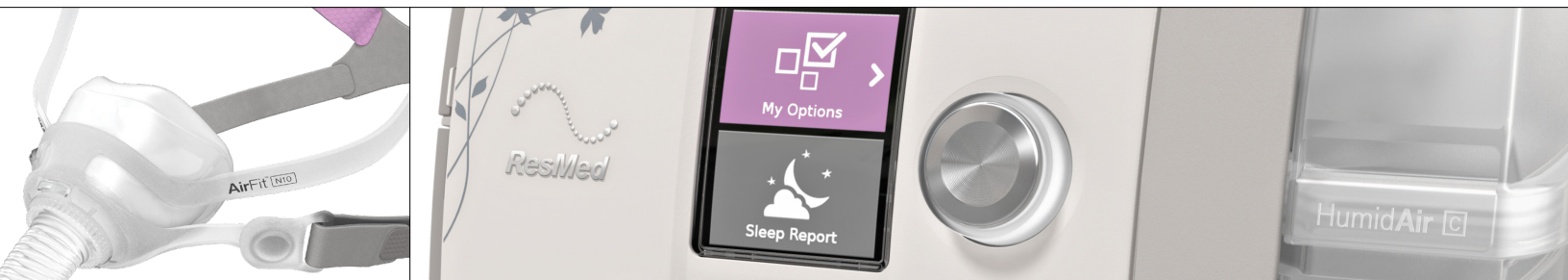
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Scripted Therapy Mode: AVAPS

Mode	Philips	ResMed	Mode
AVAPS	BiPAP® AVAPS	AirCurve 10 ST-A	Conversion Formula
	Tidal Volume (Vte; mL)	Target Alveolar Ventilation (1–30 L/min)	Target Va: set $V_t = V_{te}$ (V_t , along with the patient's height and RR, can be used to calculate the V_a)
	IPAP Max (4–25 cm H ₂ O)	Max PS (0–27 cm H ₂ O)	Max PS = IPAP Max–EPAP
	IPAP Min (4–25 cm H ₂ O)	Min PS (0–20 cm H ₂ O)	Min PS = IPAP Min–EPAP
	EPAP (4–IPAP)	EPAP (3–25 cm H ₂ O)	EPAP = EPAP
	BPM (breaths per minute): 0–30	Target Pt Rate (8–30 bpm)	See Recommendation Table
	Height (44–100 inches)	Set to patient's actual height in inches	

Note: CPAP, S, ST and T modes also available on device

Example

Mode	Philips	ResMed	Mode
AVAPS	BiPAP® AVAPS	AirCurve 10 ST-A	Conversion Formula
	Tidal Volume (Vte): 500 mL	Target Alveolar Ventilation: set $V_t = 500$ mL	
	IPAP Max: 15 cm H ₂ O	Max PS: 10 cm H ₂ O	Max PS = IPAP Max–EPAP
	IPAP Min: 10 cm H ₂ O	Min PS: 5 cm H ₂ O	Min PS = IPAP Min–EPAP
	EPAP: 5 cm H ₂ O	EPAP: 5 cm H ₂ O	EPAP = EPAP
	BPM (breaths per minute): 12/min	Target Pt Rate: 15/min	
	Height: 72 inches (6 ft)	Set to patient's actual height in inches	

Backup Rate Recommendation Table

Philips Respironics Breaths per Minute (bpm)	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ResMed Target Patient Rate (RR)	15	15	15	15	15	15	16	17	18	19	20	21	22	23	24	25

Optimally, Target Patient Rate (RR) should be set at the patient's spontaneous respiratory rate

HCPCS Coding	Description
E0471	Bilevel device with a backup rate

Scripted Therapy Mode: AVAPS

iVAPS

iVAPS and AVAPS therapies are volume-assured pressure support devices using a fixed EPAP and auto-adjusting pressure support to manage patients with hypoventilation – particularly those whose conditions are likely to change. Patient conditions may include: restrictive conditions such as neuromuscular disease and obstructive conditions such as chronic obstructive pulmonary disease (COPD).

iVAPS is designed to automatically adjust pressure support and maintain a target alveolar ventilation (learned by the device or set by a clinician). Targeting alveolar ventilation takes into account a patient's anatomical dead space, to ventilate patients more effectively. Unlike other volume-assured modes, iVAPS maintains the alveolar target even when respiratory rate changes with its intelligent Backup Rate (iBR). Target alveolar ventilation (V_a) requires the input of patient height information to estimate anatomical dead space.

iVAPS' unique Learn Targets feature can actually learn the patient's tidal volume and spontaneous respiratory rate, so the target alveolar ventilation and intelligent backup rate are set appropriately. Learn Targets saves you time and enables you to review and accept/change recommended target settings before starting therapy. When using the Learn Targets feature, the patient should be awake and sitting quietly. During this time, a low level of EPAP and a small amount of pressure support will be provided to prevent CO_2 rebreathing and promote comfort while providing no ventilatory assistance. The patient's minute ventilation is learned during this time. Minimum and maximum pressure support values can be set to determine the range of pressure support used when a patient's ventilation varies from the target.

NIV with Volume-Assured Pressure Support

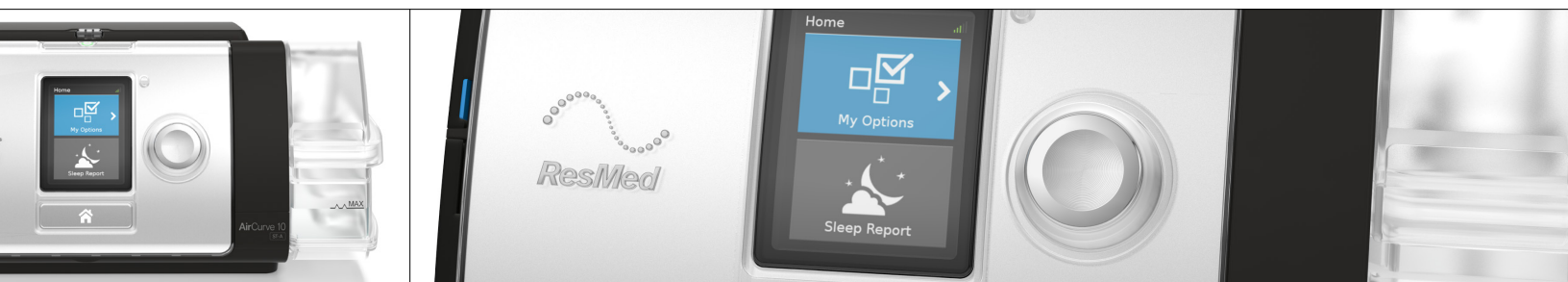
Noninvasive ventilation (NIV) has two key goals: to improve the exchange of oxygen and carbon dioxide, and to support the work of breathing when the patient's own physiology is ineffective. To achieve these goals, the appropriate inspiratory and expiratory pressures (IPAP and EPAP settings) to support the patient's ventilatory demands needs to be determined. In patients with progressive conditions (and even during different sleep states or body positions), the IPAP and EPAP settings required to achieve this objective may change over time. These patients may benefit from volume-assured pressure support devices that use auto-adjusting pressure support to reach a

prescribed ventilation target and therefore adjust the IPAP according to the patient's changing needs. iVAPS adapts to the patient's changing ventilatory requirements by constantly monitoring their alveolar ventilation in relation to target alveolar ventilation, and the patient's actual respiratory rate in relation to the target rate. iVAPS is quick enough to maintain stable alveolar ventilation, helping to minimize disruptions to blood gases even during sleep, especially during postural changes and REM sleep. This may in turn contribute to improved daytime ventilation.

Intelligent Backup Rate (iBR)

ResMed's iVAPS technology accommodates changes in your patient's respiratory rate to consistently meet the required ventilation target. iBR maximizes the patient's opportunity to spontaneously breathe yet provides a safety net with backup breaths when required. iBR

stays out of the way while the patient is spontaneously breathing and steps in, using the patient's own breath rate during periods of no spontaneous effort.



Scripted Therapy Mode: AVAPS

Inspiratory Time and Trigger and Cycle Sensitivities

ResMed's unique synchrony technology includes the TiControl feature along with settable trigger and cycle sensitivity and Rise Time settings. These technologies can be used to optimize synchrony and accommodate patients' unique needs. TiControl provides minimum and maximum inspiratory time limits (Ti Min and Ti Max) for each breath. Ti Min and Ti Max can be used to prolong or limit the time the device spends at IPAP. Along with Vsync, TiControl can ensure synchronization even in the presence of significant mouth and/or mask leak. Ti Max enables you to set a maximum inspiratory time to reduce the risk of intrinsic positive end-expiratory pressure (PEEP) and missed patient effort. Ti Min can be used to set a minimum inspiratory time to ensure adequate time for gas exchange without having to increase the pressure setting.

Adjustable trigger and cycle sensitivities can be used to optimize synchrony. The device triggers (initiates IPAP) and cycles (initiates EPAP) as it senses changes in patient flow. At higher sensitivity settings, smaller flow changes make it easier for the patient to trigger and cycle the device. Adjusting trigger sensitivity can support patients with a weak inspiratory effort by increasing sensitivity to recognize every patient's effort. Adjustable cycle sensitivity is crucial for those at risk for intrinsic PEEP or premature breath cycle. Setting a rapid rise time and high cycle sensitivity can help decrease the inspiratory time and extend the expiratory time, resulting in improved patient-ventilator synchrony for patients who are prone to intrinsic PEEP. A slower rise time and lower cycle sensitivity, along with an adequate Ti Min, ensure the patients with weak inspiratory effort have adequate time for gas exchange.



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