

## Sailing toward therapeutic success ...

High reliability in biLEVEL treatment is the primary influence in determining therapeutic success and ensuring high compliance rates and patient well-being. This applies not only to obstructive sleep apnea but includes further indications of sleep related breathing disorders (SRBD). Increasingly, the SRBD may be treated successfully at home by assisted non-invasive ventilation therapy.

Nocturnal hypoventilation or a central respiratory disorder (for example, central sleep apnea) are possible indications for biLEVEL treatment. Moreover, the prescription of biLEVEL treatment is of increasing importance in the home therapy of restrictive and obstructive pulmonary diseases (for example kyphoscoliosis and COPD).

**OptiSENSE**, the new and optimised trigger algorithm in Moritz®S and Moritz®ST makes biLEVEL therapy more efficient and safe – increasing the scope of indication while relying on the renowned MAP high quality standards.

**... through systematically developed proven technology.**



Moritz®S



Moritz®ST



Sailing toward Therapeutic Success:  
The biLEVEL Systems for Respiratory Therapy  
and Non-Invasive Home Ventilation

MAP



Therapy

Sleep Medicine / Home Ventilation

## Breathe Deeply and Enjoy the Relief

## Moritz® ST: for Non-Invasive Home Ventilation

Whether central sleep apnea, nocturnal hypoventilation or restrictive and obstructive pulmonary diseases (kyphoscoliosis, COPD etc.) need to be treated, the new Moritz® ST with its ST mode (Spontaneous/Timed) provides a wide range of solutions in the therapy of sleep related breathing disorders (SRBD).

Moritz® ST has an individually adjustable minimum frequency of 4 to 30 breaths per minute (BPM). With this minimum frequency, Moritz® ST switches automatically from expiration to inspiration as soon as the patient's spontaneous breathing ceases. By adjusting the minimum frequency and the maximum inspiration time of each breath, the ratio between inspiration and expiration may be individually defined. The patient's individual breathing pattern is supported through weighting inspiration on a scale between 20% and 80%. Moreover, trigger sensitivity and flank steepness may also be freely defined. Combining all characteristics, a high degree of respiratory synchronicity and regularity results in effective and gentle therapy.

Moritz® ST's compact design including the integrated, heatable air humidifier, provides each patient with an effective home treatment and few side effects. Furthermore, the low operating noise level contributes to a high degree of compliance. Moritz® ST is the synonym for efficiency, convenience, and easy handling – **for both physician and patient.**



# Breathe Deeply and Feel Well

## Patient Comfort through Air Humidification, Low Operating Noise, Ramp and Mobility

During therapy, the sensitive mucous membranes of the upper airway are subjected to a high airflow, which may impair their moistening function. Often, the mucous membranes are irritated and dry out. The consequences may be rhinitis and a dry nose. Countering this, Moritz®S and Moritz®ST are both available as complete integrated units with an adjustable warm air humidifier. Units without humidification may easily be retrofitted. This ensures that the breathed air is effectively humidified, the upper airway moistening function remains unimpaired and as a result, the patient is highly compliant.

With an operating noise level < 30 dB (A) at 10 hPa, both Moritz®S and Moritz®ST comply with the recommended values set by the WHO (Jan. 97) for "undisturbed sleep". Consequently, both the bed partner and the patient remain undisturbed, supplementing patient satisfaction and compliance.

A sleep ramp and the automatic start-stop mechanism facilitate falling asleep as if no therapy unit were present at all. After putting on the mask, Moritz®S and Moritz®ST may be automatically started by a strong breath. The sleep ramp, adjustable in 5-minute increments between 0 and 45 minutes, gradually increases the pressure so that the patient may fall asleep, almost undisturbed. The therapeutic pressure level is only generated when necessary.

Moritz®S and Moritz®ST may be used (almost) anywhere in the world: the devices automatically switch between 90 and 250 V and a converter for 12 and 24 V operation in vehicles is available too. Both systems are small and lightweight, come in a handy hygiene box which provides sufficient space for all necessary accessories and includes an international service and emergency document in 12 languages. Efficient therapy is guaranteed at all times, even while travelling.



## The Right Equipment on Board

### Making Everyday Clinical Life Easier

Both Moritz®S and Moritz®ST use an optional external interface to provide analogue respiratory flow and pressure signals. This data may be transmitted directly to a PSG unit allowing for simple evaluation and documentation of the therapeutic pressure setting and therapy control. By doing away with both a thermistor and/or an additional pneumotachograph the application is now considerably simplified.

All parameters may be easily varied, either menu-controlled using the proven, easy to handle Twister remote® control system, or by means of three buttons on the back of the unit. This provides a fast, uncomplicated overview of the system's functions and of the therapeutic parameters and makes their variation possible at any time.

The first weeks of patient therapy in particular, decide the long-term acceptance of therapy by the patient<sup>1</sup>. Moritz®S and Moritz®ST log the patient's breathing hours. This data provides an objective basis for intensifying and encouraging co-operation between patient and physician contributing to sustainable therapeutic success.

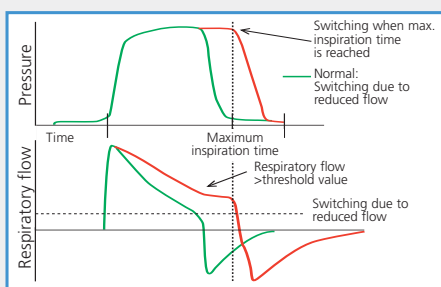
<sup>1</sup> Gerard Ngyen et al., 1998, Dec. 9 – 11, Grenoble

## The Harmonious Interaction of all Factors to Win the Regatta

### Therapeutic Efficiency in Every Aspect

#### Maximum inspiration time for high compliance

The great variety of physiological respiratory patterns in sleep and other factors may negatively influence artificial respiration and respiratory therapy. Particularly challenging to biLEVEL systems are reoccurring major leakages (oral leakages, mask leakages). Both Moritz®S and Moritz®ST, allow for the setting of a maximum inspiration time during spontaneous respiration. With this function, a de-synchronisation between the system and the patient is avoided – increasing both therapy compliance and efficiency considerably. Even oral leakages that cannot be eliminated are efficiently compensated. The Moritz®S and Moritz®ST blower has a high



flow reserve providing for higher flow rates and the effective washing of full-face masks. Pressure stability is ensured even at high therapy pressures.

#### Trigger sensitivity and flank steepness – individuality at the press of a button

Individuality requires flexibility. Moritz®S and Moritz®ST offer a trigger sensitivity which may be adjusted in 5 stages. The flank steepness for changing between inspiration and expiration may be set in 3 stages. This meets the patient's qualitative expectations resulting in satisfaction and increased compliance.

#### Alarm functions - safety when needed

For extraordinary situations during therapy (e.g. power failure), a power failure and leakage alarm are integrated in Moritz®S and Moritz®ST. These functions contribute considerably to therapeutic safety. The alarms are normally inactive and are only turned on if the patient and physician consider them important.

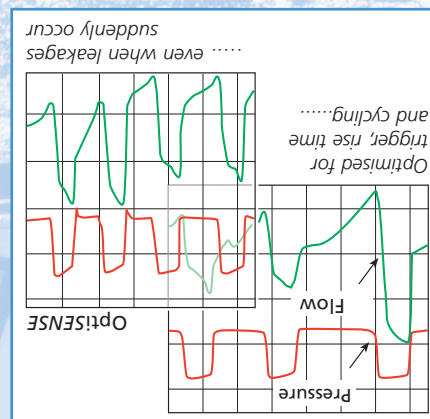
#### High quality standards – promoting therapeutic success

A primary aspect ensuring high quality standards is the pressure measurement in the mask. Pressure fluctuations are regulated immediately, leading to outstanding pressure stability – even when an air humidifier is retrofitted to the system. The high leakage compensation in Moritz®S and Moritz®ST contributes further to pressure stability. This results in a maximum reduction in respiratory work, being particularly advantageous to those patients whose respiratory muscles need to be relaxed.

# Moritz®S and Moritz®ST: Setting the Sails

## Therapeutic Efficiency and Patient Comfort in Daily Clinical Practice

A decisive factor in bileVEL therapy is the accurate recognition of inspiration and expiration. Accurate breathing cycle recognition provides for precise and rapid switching, which results in a safe therapy synchronised with the patient's breathing. Based on years of experience in the bileVEL area, MAP has developed OptiSENSE, a completely new algorithm fulfilling this requirement.



From the patient's perspective, equipment characteristics that ensure a "more comfortable" therapy, contribute markedly to compliance – comfort is not a luxury but a necessity. Moritz®S and Moritz®ST are easy to operate and satisfy all of MAP's high quality standards.

In supporting daily clinical practice and allowing for efficient therapy control, Moritz®S and Moritz®ST prove exemplary. All parameters may easily be set and both systems provide physician and staff with important raw data.

The sails are set with Moritz®S and Moritz®ST.

## Technical data

### Moritz®S / ST

<b>Product class</b>	Ila according to MPG
<b>Mains Connection</b>	100 V AC to 240 V AC, 1 A AC to 0.75 A AC, 50 Hz / 60 Hz Automatic voltage and frequency recognition
<b>Electric Safety Precautions</b>	2 fuses 230 V, 1AT, Protection class II, type B
<b>Mean Power Consumption</b>	Stand-by operation: 13 VA (W) Air humidifier off: 29 VA (W) Air humidifier on: 40 VA (W) Measured under normal breathing at 9 hPa, mean heating power of the air humidifier and 230 V
<b>Pressure Range</b>	IPAP: 4-18 hPa (mbars) adjustable in 0.1 mbar increments EPAP: 4-18 hPa (mbars, adjustable in 0.1 mbar increments)
<b>Pressure Stability</b>	± 0.5 hPa
<b>Pressure Fluctuation</b>	4 to 10 hPa: ± 0.25 hPa 10 to 18 hPa: ± 0.5 hPa Measured according to EN ISO 17510-1 with IPAP = EPAP = 6 / 10 / 12 / 18 hPa and VT = 500 ml with 10 / 15 / 20 sinusoidal waves per minute without air humidifier
<b>Level of Acoustic Pressure</b>	Maximum 30 dB(A) Measured according to ISO 17510-1 at 10 hPa in the patient's vicinity over an angle of 180° in relation to the device front at 10 positions at a distance of 1 m and the same distance from one another at a height of 60 cm
<b>Air Filter</b>	Filter class G4 (EU4) according to DIN EN 779
<b>Flow Delivery Rate</b>	185 l/min on average
<b>Dimensions</b>	With air humidifier (L x W x H): 330 mm x 183 mm x 190 mm
<b>Weight</b>	4.2 kg without air humidifier 4.5 kg with air humidifier
<b>Capacity of the Air Humidifier</b>	At least 90 % RH in the breathing mask at 23 °C ambient temperature and 60 % surrounding humidity, 10 hPa, 26 l/min and maximum humidifier power
<b>Water Consumption</b>	Approximately 18 ml H <sub>2</sub> O/h at 23 °C ambient temperature and 60% surrounding humidity, 10 hPa, 26 l/min and maximum air humidifier power
<b>Operating Temperature</b>	10 °C to 35 °C (50 °F to 95 °F)
<b>Operating Humidity</b>	10 % RH to 90 % RH
<b>Operating Air Pressure</b>	800 hPa to 1060 hPa
<b>Transport and Storage Temperature</b>	-25 °C to + 70 °C (-13 °F to + 158 °F)
<b>Transport and Storage Humidity</b>	10 % RH to 95 % RH
<b>Transport and Storage Air Pressure</b>	700 hPa to 1060 hPa

### Functions

- 2-pole mains switch for turning off stand-by operation
- Liquid crystal display for checking the settings
- Sleep ramp adjustable from 0 to 45 minutes in 5-minute increments
- Automatic start/stop control on/off
- Keyboard for menu selection and setting parameters
- Deactivatable acoustic power failure alarm
- Deactivatable acoustic leakage alarm
- Remote control connection for the physician for setting and displaying the parameters (Twister remote®)
- Display of the respiratory flow curve on the remote control device (Twister remote®)
- Trigger sensitivity adjustable in 5 increments (Twister remote®)
- Pressure rise and pressure drop adjustable in 3 increments (Twister remote®)
- Maximum inspiration time: 0.5 to 12 s, adjustable in 0.1-second increments (Twister remote®)
- Selectable display language  
D, GB, F, NL, E, I (Twister remote®)

### Additional Function of Moritz®ST

- Minimum frequency of 4 to 30 breaths per minute, adjustable in increments of 1 breath (Twister remote®)
- Depiction of the inspiration portion of a breath from 20 % to 80 % in increments of 1 % (Twister remote®)
- Change between ST and S mode (Twister remote®)

### Standards

- DIN EN 60601-1** General specification for the safety of medical electric device
- DIN EN 60601-1-2** Supplement: electromagnetic compatibility
- EN ISO 17510-1** Sleep apnea therapy device
- CE designation in accordance to class Ila as described in EC-guidelines 93/42/EWG**



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### Quality Management

Development, manufacture, distribution and service certified according to ISO 9001 : 2000 and ISO 13485

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