

## Vamos® / Vamos® plus Anaesthetic Gas Monitors

Targeted, safe anaesthesia requires efficient anaesthetic gas monitors. This is exactly what Vamos® and Vamos® plus compact anaesthetic gas monitors provide by reliably displaying carbon dioxide, nitrous oxide and volatile anaesthetic gas concentrations.



## Benefits

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### Efficient anaesthetic gas monitors

Vamos® / Vamos® plus are efficient anaesthetic gas monitors for use with adult, paediatric and neonatal patients. For Patient monitoring, concentrations of carbon dioxide, nitrous oxide and volatile anaesthetic gases in the respiratory gas mixture are measured and displayed.

The carbon dioxide concentration is displayed as a real-time curve. Additionally, inspiratory and expiratory concentrations are displayed for all measured gas concentrations. The respiratory rate is determined from the carbon dioxide concentration curve and then displayed.

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### Vamos plus with automatic detection of volatile anaesthetic agents

In order to make your work easier and provide greater safety for patients, Vamos plus automatically detects volatile anaesthetic agents, so long as a maximum of two agents are used simultaneously. As well as displaying the type and concentration of the primary volatile anaesthetic agent, the monitor also displays the type and concentration of any potential second volatile anaesthetic agent separately.

Whereas the Vamos plus version of the monitor detects anaesthetic agents automatically, Vamos allows manual input of the anaesthetic agent being used.

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### Protect your patients

Vamos and Vamos plus use the advanced Waterlock® 2 water trap. Its hydrophobic membranes allow gaseous components of the sample gas to pass through, while reliably protecting the sensors of Vamos and Vamos plus from condensed water, pathogens and other contaminants.

So long as the anaesthesia machines have a corresponding functionality, the sampling gas can be recycled back into the breathing system. This means that low flow anaesthesia can be used. The moisture in the breathing gas, essential for gentle ventilation of your patients, is recycled, thereby reducing the consumption of anaesthetic agents.

Waterlock 2 is optimised in combination with the Dräger sample gas lines and corresponding ventilation accessories to ensure accurate gas measurement and good curve display.

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### Intuitive operation and clear display

Vamos and Vamos plus are intuitive to use via a control knob and a few keys. The control knob is used to navigate the simple menus and to set and confirm alarm thresholds. Separate keys are available for activating the standby function and for temporarily suppressing acoustic alarms.

Alarms and status messages are displayed optically and acoustically according to their priority. The CO<sub>2</sub> curve, measured parameters and alarm and status messages are shown on a high-quality display in a clear layout.

## Benefits

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### Integration into workstations

Vamos and Vamos plus are handy, lightweight anaesthetic gas monitors, which can be safely and ergonomically integrated into clinical workstations. Even with the battery installed, Vamos and Vamos plus only weigh 2.1 kg. The anaesthetic gas monitors can be placed separately on flat surfaces such as e.g. shelves or integrated into workstations by means of mountings.

The optional mounting plate fits into standard holding arms or retaining stands. Dräger offers a comprehensive selection of suitable holding arms, rail mountings and a choice of swivelling or tilting retaining stands.

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### Integral battery

Vamos and Vamos plus can optionally be fitted with an integral Li-ion battery. This allows Vamos and Vamos plus to continue operating for at least one hour in the event of a mains power outage. Battery charging is fully automatic.

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### Allocation of parameters

Parameters and curves are available via a serial interface for display and automated documentation. These data can be accessed via the Dräger MEDIBUS protocol, for example to create electronic anaesthesia protocols.

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### Low-maintenance and durable

Vamos and Vamos plus anaesthetic gas monitors have been developed to require minimal maintenance and have a long service life. The Dräger infrared spectroscopic sensor technology used in these monitors is wear-free, since it involves no moving parts such as e.g. filter wheels. In addition, the water trap technology reliably protects the anaesthetic gas monitor from solid or liquid contaminants. Since Waterlock 2 is simple to empty, it can be used for up to four weeks before it needs changing.

Vamos and Vamos plus are calibrated at the time of dispatch and do not require readjustment by users or service personnel.

## System Components



D-8838-2014

### Dräger Fabius® Tiro

Get the most out of even the smallest spaces with a compact yet fully featured anaesthesia solution designed for use in a variety of specialised environments.



D-47657-2012

### Dräger Fabius® plus XL

The Dräger Fabius plus XL combines proven German engineering you can count on with high performance ventilation therapy. Thanks to its scalable design concept, it allows you to choose the quality workstation you want now without losing sight of your future goals and needs.

## Accessories



D-14348-2017

### WaterLock 2

Perfect protection for precise gas measurement. Dräger WaterLock 2 safely stops water from getting into the multi-gas sensor. The measurement system is optimally protected by Dräger's special membrane technology.

## Accessories



D-37366-2015

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### Gas sample line

The Dräger gas sample line is optimised for accurate readings and good curve display.



D-37360-2015

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### Gas sample recycling

So long as the anaesthesia machines have a corresponding functionality, the sampling gas can be recycled back into the breathing system. This means that low flow anaesthesia can be used, thereby allowing optimum conditioning of the breathing gas to ensure gentle ventilation of your patients. It also significantly reduces the consumption of volatile anaesthetic agents.

## Technical Data

### Vamos® / Vamos® plus<sup>1</sup>

#### Operating characteristics

Weight	1.6 kg (3.5 lbs) without battery 2.1 kg (4.6 lbs) with battery
Dimensions (H x W x D)	16.6 cm x 24.0 cm x 16.5 cm (6.5 in x 9.5 in x 6.5 in)
Mains power supply	100 to 240 V ~ 50/60 Hz
Maximum power consumption (during warm-up, during operation, on standby)	45 W / 35 W / 28 W
Operating time with battery (optional)	> 60 min.
Sample flow rate	200 ± 20 ml/min
Interface	1x RS 232 (MEDIBUS protocol)

#### Ambient conditions

Temperature	10 to 40 °C (50 to 104 °F)
Atmospheric pressure	620 to 1,100 hPa (9.0 to 15.9 psi)
Altitude	up to 4,000 m (13,123 ft)

#### Displayed curves and parameters

Curve	CO <sub>2</sub>
Parameters	inspiratory CO <sub>2</sub> , expiratory CO <sub>2</sub> inspiratory N <sub>2</sub> O, expiratory N <sub>2</sub> O inspiratory anaesthetic agent, expiratory anaesthetic agent Vamos® plus: primary and secondary anaesthetic agent Vamos®: manually input anaesthetic agent available anaesthetic agents: isoflurane, halothane, enflurane, sevoflurane, desflurane Respiratory rate
Displayed messages	prioritised alarm messages, status messages
Alarm list	max. 10 active alarms in addition to the two alarms in the screen header
Non-adjustable alarms	apnoea, MAC > 3, inN <sub>2</sub> O
Adjustable alarms	inCO <sub>2</sub> high, etCO <sub>2</sub> low, etCO <sub>2</sub> high inspiratory anaesthetic agent concentration high/low (Vamos® plus: primary and secondary anaesthetic agent, Vamos®: manually input anaesthetic agent)
Status messages	prioritised, warm-up process, mains/battery status, gas flow status, loudspeaker status, fan status

#### Measured value displays

Warm-up time at ambient temperature > 13 °C	< 5 min
System response time	< 3.0 s
Measuring range CO <sub>2</sub>	0 to 10 Vol % 0 to 10 kPa 0 to 76 mmHg
Accuracy CO <sub>2</sub>	±(0.43 Vol % + 8 % rel.) ±(0.43 kPa % + 8 % rel.) ±(3.3 mmHg % + 8 % rel.)
Response time (t10/90) CO <sub>2</sub>	< 300 ms
Measuring range N <sub>2</sub> O	0 to 100 Vol %
Accuracy N <sub>2</sub> O	±(2 Vol % + 8 % rel.)
Response time (t10/90) N <sub>2</sub> O	< 300 ms
Measuring range: anaesthetic agent	0 to 8.5 Vol % (isoflurane and halothane)

## Technical Data

	0 to 10 Vol % (sevoflurane and enflurane)
	0 to 20 Vol % (desflurane)
Accuracy: anaesthetic agent	±(0.20 Vol % + 15 % rel.)
Response time (t10/90) anaesthetic agent	< 450 ms
Respiratory rate measuring range	0 to 100 /min
Accuracy (I:E 1:2)	0 to 80 /min: ±1 /min
	> 80 /min: not specified
Configuration	activate/deactivate alarm
	alarm volume, brightness of display
	Settings after switching on
	Language
	Interface settings
	Connection for gas sample recycling
<b>Equipment classification</b>	
Classification under Directive 93/42/ EEC, Annex IX	Ila
UMDNS Code	17-445

### Standards

IEC 60601-1 (2nd and 3rd edition) Medical electrical equipment Part 1: General requirements for safety	
IEC 60601-1-2 (2nd and 3rd edition) Medical electrical equipment Part 1 – 2: General requirements for safety, collateral standard: Electromagnetic compatibility – Requirements and tests	
IEC 60601-1-4 (2nd edition) Medical electrical equipment Part 1 – 4: General requirements for safety, collateral standard: Programmable medical electrical systems	IEC 60601-1-2 (4th edition) Medical electrical equipment Part 1 – 2: General requirements for safety, collateral standard: Electromagnetic disturbance: requirements and tests
IEC 60601-1-8 (2nd edition) Medical electrical equipment Part 1 – 8: General requirements for safety, collateral standard: General requirements, tests and guidelines for alarm systems in medical electrical systems	IEC 60601-1-8 (3rd edition) Medical electrical equipment Part 1 – 8: General Requirements for Basic Safety and Essential Performance collateral standard: Alarm systems – general requirements, tests and guidelines for alarm systems in medical electrical devices and in medical systems
ISO 21647 Medical electrical equipment Particular requirements for the basic safety and essential performance of respiratory gas monitors	ISO 80601-2-55 Medical electrical equipment Part 2 – 55: Particular requirements for basic safety and essential performance of respiratory gas monitors

<sup>1</sup> Technical data are valid for the latest version of Vamos® and Vamos® plus Item no. 68 73 350.

Technical data for older versions of Vamos® and Vamos® plus may differ.

Older versions of Vamos® and Vamos® plus can be identified by their item number.

Vamos® and Vamos® plus (68 73 350) are not available in all markets.

## Notes

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