



# MIRUS™ Controller

The assistant at your side

Technical Specifications

## General specifications

### HW options

MC-MC-ISO (Isoflurane)

MC-MC-SEVO (Sevoflurane)

MC-MC-DES (Desflurane)

### Dimensions

<i>Dimensions (LxHxD)</i>	325 x 195 x 210 mm (12.8 x 7.6 x 8.2 in.)	<i>Weight</i>	9.0 kg (15.4 lb)
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### Environmental conditions (Operation)

<i>Temp. range (ISO, SEVO)</i>	+10 - +40°C	<i>Temp. range (DES)</i>	+10 - +30°C
<i>Atm. pressure range</i>	700 - 1,060 hPa	<i>Equivalent altitude</i>	3,000 - 0 m (9,840 - 0 ft)
<i>Humidity range</i>	10 - 90% relative		

### Environmental conditions (Storage)

<i>Temperature range</i>	-20 to +50°C	<i>Atm. pressure range</i>	500 - 1,060 hPa
<i>Equivalent altitude</i>	5,500 - 0 m (18,050 to 0 ft)	<i>Humidity range</i>	10 - 90% relative

### Environmental conditions (Transport)

<i>Temperature range</i>	-20 to +70°C	<i>Atm. pressure range</i>	500 - 1,060 hPa
<i>Equivalent altitude</i>	5,500 - 0 m (18,050 to 0 ft)	<i>Humidity range</i>	10 - 90% relative

### Device volume

<i>Noise level</i>	≤ 49 dB (A)	<i>Alarms at max. setting</i>	> 66 dB (A) (tone sequence)
<i>"Panic" alarms</i>	> 63 dB (A) (permanent)		

### Classifications

<i>CE class according to 93/42/EEC</i>	IIb	<i>Protection class acc. to EN 60601-1</i>	I
<i>IP Code</i>	IP20	<i>Protection type acc. to EN 60601-1</i>	B

### GMDN codes

<i>MC-MC-ISO</i>	36890	<i>MC-MC-DES</i>	36979
<i>MC-MC-SEVO</i>	36980	<i>UMDSNS code</i>	10-144

### Electrical supply

<i>Nominal voltage</i>	100 - 230 VAC ± 10%	<i>Frequency</i>	50 - 60 Hz ± 5%
<i>Power consumption</i>	< 75 VA	<i>Grounding</i>	Standard ground stud
<i>Internal backup</i>	Backup time: 15 min		

### Agent supply

<i>Internal reservoir</i>	Max. capacity = 270 ml Reserve capacity = 20 ml	<i>Status information</i>	On Screen
<i>Filling system</i>	Proprietary filling system, agent spec. acc. ISO 5360	<i>Filling capacity</i>	Maximum = 190 ml Max. overflow protect = 250ml

### Display structure

<i>Screen</i>	Touchscreen, 5.7", confirm button	<i>Menu language</i>	English, German, French, Italian, Spanish, Polish
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### Applied standards

EN 1041	EN 10993-1	EN 60529	EN 60601-1
EN 60601-1-2	EN 60601-1-8	EN 62304	EN 62366-1
EN ISO 5360	EN ISO 14971	EN ISO 15223-1	EN ISO 80601-2-13
EN ISO 80601-2-55			

### Units

<i>CO<sub>2</sub></i>	mmHg, Vol%, kPa	<i>Pressure (Paw, PEEP)</i>	mbar, cmH <sub>2</sub> O
<i>VA concentration</i>	Vol%		

### Electromagnetic compatibility (according to EN 60601-1-2)

Test parameters and limit values can be obtained from the manufacturer if required

## Controls and Ranges

### Agent dosage

Isoflurane

*Range* MAC 0.1 - 2.0 @ MVi 3.0 - 15.0 L/min where  
MAC 1 = 1.15 Vol%  
@ age = 40 *Increment* 0.1 MAC @ single taps on  
button 0.5 MAC @ pressing  
button > 1 sec

Sevoflurane

*Range* MAC 0.1 - 2.0 @ MVi 3.0 - 15.0 L/min where  
MAC 1 = 1.9 Vol%  
@ age = 40 *Increment* 0.1 MAC @ single taps on  
button 0.5 MAC @ pressing  
button > 1 sec

Desflurane

*Range* MAC 0.1 - 2.0 @ MVi 3.0 - 15.0 L/min where  
MAC 1 = 6.7 Vol%  
@ age = 40 *Increment* 0.1 MAC @ single taps on  
button 0.5 MAC @ pressing  
button > 1 sec

### Alarm settings

et CO<sub>2</sub> min / max

*Range* 15 - 150 mmHg / 2.0 - 19.7 Vol% / 2.0 - 20.0 kPa *Increment* 1 mmHg / 0.5 Vol% / 0.1 kPa  
@ single taps on button  
5 mmHg / 1.0 Vol% / 0.5 kPa  
@ pressing button > 1 sec

et ISO min / max

*Range* 0.0 - 6.0 Vol% *Increment* 0.1 Vol%  
@ single taps on button  
0.5 Vol%  
@ pressing button > 1 sec

et SEVO min / max

*Range* 0.0 - 8.0 Vol% *Increment* 0.1 Vol%  
@ single taps on button  
0.5 Vol%  
@ pressing button > 1 sec

et DES min / max

*Range* 0.0 - 18.0 Vol% *Increment* 0.1 Vol%  
@ single taps on button  
0.5 Vol%  
@ pressing button > 1 sec

Apnoe time

*Range* 15 - 60 sec *Increment* 5 seconds

Alarm volume

*Range* 50 - 100% *Increment* 10% @ single taps on button

### Patient data settings

Age

*Range* 10 - 115 years *Increment* 1 year  
@ single taps on button  
5 years  
@ pressing button > 1 sec

Size

*Range* 100 - 250 cm *Increment* 5 cm  
@ single taps on button  
10 cm  
@ pressing button > 1 sec

Weight

*Range* 15 - 125 kg *Increment* 1 kg  
@ single taps on button  
5 kg  
@ pressing button > 1 sec

## Monitoring system

### Safety monitoring

<i>Patient</i>	Breathing activity	<i>Alarms</i>	Apnoea
<i>Tidal volume</i>	Low Vt		

### Agent dosage monitoring

<i>Dosage start</i>	Start of inspiration	<i>Alarms</i>	Dosage failed! No delivery
<i>Dosage end</i>	End of inspiration or end of delivered anaesthetic agent volume	<i>Control</i>	Monitoring of applied volume of anaesthetic agent. Comparison of calculated with measured volume

### Gas monitoring

ISO, SEVO, DES			
<i>Numerical data</i>	etVA	<i>Alarms</i>	Low etVA, High etVA
CO <sub>2</sub>			
<i>Numerical data</i>	etCO <sub>2</sub>	<i>Alarms</i>	Low etCO <sub>2</sub> , High etCO <sub>2</sub>

## Performance

### Agent dosage accuracy

ISO, SEVO, DES			
<i>Maximum</i>	+ 15% of set MAC @ all settings	<i>Minimum</i>	- 15% of set MAC @ Vt = 500 ml, Rate = 15/min, I:E = 1:2, MAC = 1.0
<i>Wash-In speed</i>	Turtle	<i>Maximum Rate</i>	40/min

### Respiratory monitoring accuracy

<i>Volumes</i>	± 20% @ Vt 200 ml - 2000 ml (BTPS corrected)	<i>Pressures</i>	± 4.0% or 2 cmH <sub>2</sub> O whichever is greater @ -10 - 100 cmH <sub>2</sub> O (@rate < 40/min)
<i>Rate</i>	± 1 breath per minute (@rate < 40/min)	<i>I:E</i>	± 25% (@rate > 40/min)

### Gas monitoring accuracy

CO <sub>2</sub>	0 - 1 Vol% ± 0.1 Vol% 1 - 5 Vol% ± 0.2 Vol% 5 - 7 Vol% ± 0.3 Vol% 7 - 10 Vol% ± 0.5 Vol% > 10 Vol% unspecified	<i>Isoflurane</i>	0 - 1 Vol% ± 0.15 Vol% 1 - 5 Vol% ± 0.2 Vol% > 5 Vol% unspecified
<i>Sevoflurane</i>	0 - 1 Vol% ± 0.15 Vol% 1 - 5 Vol% ± 0.2 Vol% 5 - 8 Vol% ± 0.4 Vol% > 8 Vol% unspecified	<i>Desflurane</i>	0 - 1 Vol% ± 0.15 Vol% 1 - 5 Vol% ± 0.2 Vol% 5 - 10 Vol% ± 0.4 Vol% 10 - 15 Vol% ± 0.6 Vol% 15 - 18 Vol% ± 1.0 Vol% > 18 Vol% unspecified



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