Anesthesia Gas Monitoring IntelliVue G1 & IntelliVue G5

Features

- Continuous, simultaneous, real-time monitoring of respiratory and anesthetic gases.
- IntelliVue G1 is fully integrated with the Philips IntelliVue MP20/30/40/50 families of anesthesia patient monitors.
- IntelliVue G5 is fully integrated with the Philips IntelliVue MP40/50/60/70/80/90 families of anesthesia patient monitors.[1]
- Measurement of oxygen (optional for IntelliVue G1; standard for IntelliVue G5), carbon dioxide, nitrous oxide, halothane, isoflurane, enflurane, sevoflurane, desflurane.
- Manual anesthetic agent selection (IntelliVue G1).
- Automatic Agent Identification (IntelliVue G5) of up to two anesthetic agents.
- Inspiration and expiration values for all gases.
- Airway Respiration Rate (awRR), derived from CO_2 waveform.
- Minimum alveolar concentration values (MAC).
- Long-term stability offering easy and infrequent calibration.
- Individual alarm limits for each parameter.
- Quick access to the most commonly performed functions.

1.In the USA & Canada, IntelliVue G5 is also integrated with MP 20/30.

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Description

The M1013A IntelliVue G1 and the M1019A IntelliVue G5 provide a non-dispersive infrared measurement of respiratory and anesthetic gases and a paramagnetic measurement of oxygen (Fast O_2).

The IntelliVue G1 is designed to work with the Philips IntelliVue MP20/30/40/50 Anesthesia option #H30 and the IntelliVue G5 with the MP40/50/60/70/80/90[1] Anesthesia option #H30 through a digital interface (RS232).

Both gas analyzers are intended for measuring the airway gases of ventilated patients during the induction of, maintenance of, and emergence from anesthesia.

The gas analyzers produce display waves for O_2, CO_2, N_2O, and anesthetic agents, together with numerics for inspired and end-tidal values for O_2, CO_2, N_2O, anesthetic agents, MAC values and airway respiration rate.

With the IntelliVue G1 an anesthetic agent must be selected manually for measurement.

The IntelliVue G5 automatically identifies two out of five anesthetic agents at a time.

An automatic zero calibration is performed by the IntelliVue G1 and IntelliVue G5 as required to maintain measurement accuracy.

Specifications

Physical

Size (H x W x D)

85 x 300 x 232 mm, (3.35 x 11.81 x 9.13 inches).

Weight

< 4 kg (8.8 lb.) net.

Safety

Complies with:

- IEC/EN 60601-1
- UL 60601-1
- CSA C22.2 No. 601.1-M90
- IEC/EN 60601-1-1
- IEC/EN 60601-1-2

1.In the USA and Canada, IntelliVue G5 is also integrated with MP20/30

Caution:
U.S. Federal Law restricts this device to sale by or on the order of a physician.

Environmental

Operating Temperature

10 to 40 ºC (50 to 104 ºF).

Storage

-20 to 65 ºC (-4 to 149 ºF).

Operating Humidity

5 to 90 % RH max at @ 40 ºC (104 ºF).

Storage Humidity

5 to 95 % RH max. at @ 65 ºC (149 ºF).

Operating Altitude

–305 to 2900 m, (–1,000 to 9,515 ft.).

Storage Altitude

–305 to 5000 m, (–1,000 to 16,404 ft.).

Sample Flow Rate

200 ml/minute (± 20 ml/min.).

Warmup Time

1-2 minutes to measure CO_2, typically less than 6 minutes for full accuracy specifications.

Interface

RS-232-C (RJ45)

Calibration Interval

Annual Gas calibration test. Calibration is stable and normally only requires checking.

Units

mmHg, kPa, vol% for all gases,

(except for CO_2, no vol%).

Power Requirements

- *Input*: 100 to 240 V ±10 % ac.
- *Frequency*: 50/60 Hz.
- *Power consumption*: 45 VA max.

Monitored Gases / Parameters

- O_2
- CO_2
- Airway Respiration Rate (awRR)
- N_2O
- The anesthetic agents Halothane, Enflurane, Isoflurane, Sevoflurane and Desflurane. IntelliVue G1 can measure one of these manually selected agents at a time. IntelliVue G5 can automatically detect two of these agents at a time.
- Minimum alveolar concentration (MAC) values

Oxygen Measurement

Range

5 to 100 vol%.

Accuracy[1]

± 3 vol%.

Resolution

1 vol%.

Rise-time

< 500 msec typical.

Carbon Dioxide Measurement

Range

0 to 76 mmHg.

Accuracy[1]

± 0.5 vol% or 12 % relative, which ever is greater.

Resolution

1 mmHg.

Rise-time

350 msec typical[2]

1. Accuracy specifications refer to BTPS for mmHg kPa and STPD for vol% at 40-60 % relative humidity. They refer to M1658A tubing and M1657B watertrap.

Airway Respiration Rate

Derived from CO_2 waveform.

Range

0 - 60 rpm.

Accuracy

± 1 rpm.

Resolution

1 rpm.

Detection Criteria

adaptive threshold

Nitrous Oxide Measurement

Range

0 to 100 vol%.

Accuracy[1]

2.0 % + 8 % relative.

Resolution

1 vol%.

Rise-time

500 msec typical [2]

Anesthetic Agent Measurement

The IntelliVue G1 and IntelliVue G5 identify any of the following anesthetic agents.

For IntelliVue G1 the agent must be selected manually. IntelliVue G5 automatically identifies up to two of the following agents:

2. With 2.6m M1658A tubing and M1657B watertrap (10-90 % step response) at 25°C and 40% relative humidity.

Table 1: Anesthetic Agent Measurement

Agent	Range (vol%)	Accuracy	Resolution (vol%)	Rise time typical (msec)
Halothane	0 - 8.5	0.15 vol% + 15.0 % relative	0.05	< 500
Enflurane	0 - 10.0	0.15 vol% + 15.0 % relative	0.05	< 500
Isoflurane	0 - 8.5	0.15 vol% + 15.0 % relative	0.05	< 500
Sevoflurane	0 - 10.0	0.15 vol% + 15.0 % relative	0.05	< 500
Desflurane	0 - 20.0	0.15 vol% + 15.0 % relative	0.05	< 500

Sample Delay Time

All measurements are subject to a delay of 5 seconds due to the length of the sampling path[1].

Total System Response Time

The Total System Response Time is the sum of Sample Delay Time and Rise Time.

Zero Calibration

The IntelliVue G1 and G5 request the first zero calibration not later than 5 minutes after power-on. In a steady state, a normal zero is performed not more than every 2 hours. The normal zero calibration lasts less than 21 seconds.
The O_2 zero calibration is performed once as part of the startup and typically once every 4 months of continuous operation / standby state. An O_2 zero calibration can last up to 60 seconds.

Alarms

Limit Alarms

Limit alarms are provided for the numeric values displayed by the IntelliVue G1 and IntelliVue G5 (see table 2 below).

1. With 2.6 m M1658A tubing and M1657B watertrap (10-90 % step response) at 25 °C and 40 % relative humidity.

Alarm Delay

< 19 seconds if no automatic zero calibration occurs within that time.

Apnea Alarm

Adjustable Delay Range

10 - 40 seconds

Alarm Criterion

No detected breath within the adjusted delay time.

Apnea Alarm Delay

Within 2 seconds after this criterion is met, if no automatic zero calibration occurs.

INOP Alarms

Unique INOP messages and with or without an INOP tone are triggered on the host monitor if certain conditions occur.

The exact messages depend on the host monitor used and are described in the monitor's accompanying documentation.

Table 2: Alarm Limits

Gas	High Limit Range	Low Limit Range
etCO_2	20 - 76 mmHg	10 - 75 mmHg
imCO_2	0 - 20 mmHg	none
inN_2O	0 - 82 vol%	none
inO_2 (Optional)	19 - 100 vol%	18 - 99 vol%
in/et HAL/ISO/ENF	0.1 - 7.5 vol%	0.0 - 7.4 vol%
in/et SEV	0.1 - 9.0 vol%	0.0 - 8.9 vol%
in/et DES	0.2 - 20.0 vol%	0.0 - 19.8 vol%
awRR	10 - 60 rpm (Adult, Pediatric) 30 - 60 rpm (Neonatal)	0 - 55 rpm

Options

The following options are available for the

IntelliVue G1

- #A01 - without O_2 measurement
- #A02 - with paramagnetic O_2 measurement

One of the following K-options must be ordered:

- #K11 - IntelliVue Interface Cable (1.5 m)
- #K12 - IntelliVue Interface Cable (3.0 m)

IntelliVue G5

One of the following K-options must be ordered:

- #K11 - IntelliVue Interface Cable (1.5 m)
- #K12 - IntelliVue Interface Cable (3.0 m)

Accessories

To ensure the specified performance of and to prevent possible damage to the M1013A IntelliVue G1 and the M1019A IntelliVue G5, **only** the following accessories may be used:

- M1658A Gas Sample Tube, 2.6 m
- M1657B Watertrap.
- 13902A Elbow Airway Adapter, 15 mm (right angle).
- M1612A Straight Airway Adapter.
- M1655A/B Gas Exhaust Return Line.[1]
- M1656A/B Gas Exhaust Return Filter.[1]

For service purposes, the following accessories may be used:

- M1662A Calibration Gas
- M1659A Calibration Bag.

Note: These accessories are not included with the IntelliVue G1 or the IntelliVue G5.

Documentation

The User's Guide and Service and Installation Guide for this module are included in the documentation package shipped with the Philips IntelliVue Systems.

1.May not be available in all countries.

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The IntelliVue G1 (M1013A) and the IntelliVue G5 (M1019A) comply with the requirements of the Council Directive 93/42/EEC of 14 June 1993 (Medical Device Directive).

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