IntelliVue MP40/MP50 Patient Monitor

Philips M8003A, M8004A **Technical Data Sheet**

The IntelliVue MP40 and MP50 portable patient monitors are compact in size, ergonomic, and modular in design. They share a common user interface and technological platform with the Philips IntelliVue MP2, MP5, MP20/MP30 and MP60 - MP90 patient monitors.

The monitors can be connected to Philips multi-measurement modules (MMS) or IntelliVue X2 multi-measurement modules with MMS extensions, plug-in measurement modules and the IntelliVue anesthetic gas modules to extend their functionality with plug-and-play convenience. Information portal capability provides access to the hospital network from the bedside.

The monitors are highly customizable. For each model, dedicated configurations are available for the anesthesia, critical and cardiac, and neonatal care environments.

The IntelliVue family offers a complete monitoring solution that is flexible and modular, designed to suit a broad spectrum of monitoring needs.

Measurement Features

- ECG monitoring using any combination of three to 10 electrodes.
- 12-lead ECG monitoring with five electrodes using the EASI method or with 10 electrodes using the conventional method.
- Multi-lead arrhythmia and ST segment analysis at the bedside on all available leads.
- QT/QTc interval monitoring

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- The Capnography Extension extends your measurement capability by adding mainstream or sidestream CO_2, a pressure and an additional pressure ***or*** temperature measurement plus optional cardiac output.
- Choice of high performance pulse oximetry technologies for accurate performance even in cases with low perfusion.
- Pulse Pressure Variation (PPV) can be calculated from beat-to-beat arterial pressure values.
- Minimum Alveolar Concentration (MAC) values can be calculated for anesthetic agents.
- The monitors can operate using battery power for 4 to 5 hours, depending on the monitor configuration, to let you safely and easily monitor patients during in-hospital transfer.

Usability Features

- Intuitive user interface.
- Simple menu hierarchy gives fast access to all basic monitoring tasks.
- Patient data management with tabular and graphic trends.
- Ventilation, hemodynamic, and oxygenation calculations.
- Drug Calculator
- Settings "Profiles" for rapid case turnover.
- Patented automatic alarm limits help clinicians provide care more efficiently.
- Basic Event Surveillance for automatic detection of patient status deterioration.
- Neonatal Event Review keeps a record of rapidly changing condition of neonatal patients.
- User can freeze waves on the screen and measure parts of the wave using cursors.
- Bed-to-bed overview provides clinicians with an overview of all the patient beds in their care.
- User can silence alarms from remote beds.
- User can assign a monitor and a telemetry device to the same patient. The telemetry data can be displayed as a fixed monitor overview session on the monitor.
- Choice of input devices: touchscreen, navigation point, mouse, trackball, barcode reader, keyboard or remote SpeedPoint.
- 12" TFT flat panel display with SVGA resolution, wide viewing angle, large numerics, permanently visible alarm limits, and up to six real-time waves.
- Capable of functioning in a wireless infrastructure.
- Graphical measurement window shows which measurements are being measured by which device, making it easier to resolve measurement label conflicts.
- Timer application allows you to set timers to notify you when a specific time period has expired.

Intended Use

The IntelliVue MP40 and MP50 monitors are intended to be used for monitoring, recording, and alarming of multiple physiological parameters of adults, pediatrics, and neonates in hospital environments by trained health care professionals.

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

Modularity

The monitor is available in a choice of two models, the MP50 offers touchscreen operation and the navigation point, while the main input method for the MP40 is the navigation point. Both models offer the same comprehensive range of measurements.

The monitors' functionality can be extended by connecting Philips measurement modules, multi-measurement module, X2, MMS extensions, and the IntelliVue anesthetic gas modules. The monitors are available as standalone or networked solutions.

Upgradability

The MP40/MP50 monitors' modular design allows new capabilities to be added in the future as your monitoring requirements evolve. This upgradability gives the security of knowing that the monitors can be enhanced and updated as practices and technologies advance, and it protects long-term investments.

Main Components

Display

The monitors have color LCD TFT displays with a wide viewing angle, providing high resolution waveform and data presentation.

The display, processing unit, and power supply are integrated into one device.

User Interface

The user interface is designed for fast and intuitive operation. The color graphical user interface ensures that clinicians quickly feel at ease using the monitor.

SmartKeys with intuitive icons allow monitoring tasks to be performed quickly and easily, directly on the monitor screen.

Waves and numerics are color-coded.

The monitors display up to six measurement waves simultaneously. For 12-lead ECG monitoring they can display 12 real-time ECG waves, with a rhythm strip and all ST values.

The Basic Help provides on-screen operating help, explaining INOP and alarm messages.

Touchscreen Operation

The MP50 monitor is supplied as standard with a touchscreen display with a resistive touch surface.

Input Devices

Supported input devices include the navigation point, the remote SpeedPoint and PS/2 compatible, off-the-shelf computer accessories such as mouse, trackball or barcode reader.

Navigation Point

The integrated navigation point is the primary input device for the MP40 and is also standard on the MP50 in addition to the touch screen. Its dial can be rotated to enable navigation across the monitor screen. A tactile resistance at every step gives the user control over cursor movement.

Integrated Navigation Point

The navigation point has four hardkeys:

	***Silence key*** to acknowledge all active alarms or switch alarm indicators on or off
	***Alarms key*** to pause alarm indicators or switch alarm indicators on or off
	***Back key*** to take the user back from a sub menu to a main menu
	***Main Screen key*** to take the user from any window to the main screen

Mouse/keyboard

Any specified PS/2 mouse, trackball or keyboard may be used for data entry.

Simulated Keyboard

If alpha or numeric data entry is required, for example to enter patient demographics, an on-screen keyboard will automatically appear on the screen.

Multi-Measurement Module (MMS)

The M3001A Multi-Measurement Module (MMS) can be connected without cables to the rear of the MP40 or MP50. It sends measurement waves and numerics to the monitor screen and generates alarms and INOPs. Up to eight hours of patient trends are stored in the MMS, as well as patient demographic details.

MMS with measurement extension

The MMS provides measurement data for Electrocardiogram (ECG)/ Arrhythmia, Respiration, Oxygen Saturation of Arterial Blood (SpO_2), Non-Invasive Blood Pressure (NBP), and Invasive Pressure or Temperature. It features 12-lead ECG capability, multi-lead arrhythmia, and 12-lead ST analysis.

X2 Multi-Measurement Module

The M3002A X2 Multi-Measurement Module can be connected without cables to the rear of the MP40/50. It sends measurement waves and numerics to the monitor screen and generates alarms and INOPs. Up to 24 hours of patient trends are stored in the X2, as well as patient demographic details.

IntelliVue X2 Multi-Measurement Module

The X2 provides measurement data for Electrocardiogram (ECG)/ Arrhythmia, Respiration, Oxygen Saturation of Arterial Blood (SpO_2), CO_2, Non-Invasive Blood Pressure (NBP), and Invasive Pressure or Temperature. It features 12-lead ECG capability, multi-lead arrhythmia, and 12-lead ST analysis.

The X2 can also be used as a stand-alone monitor.

MMS Extensions

A MMS Extension can optionally be slotted onto the Multi-Measurement Module or the X2 to add:

M3014A: integrated mainstream or sidestream CO_2, second Invasive Blood Pressure, third Invasive Blood Pressure or Temperature and optionally Cardiac Output/Continuous Cardiac Output.

M3016A[1]: Invasive Blood Pressure or Temperature and integrated mainstream CO_2 (optional).

M3015A: Microstream® CO_2[2], and Invasive Blood Pressure/Temperature (optional).

M3012A: Temperature and Invasive Blood Pressure and an additional Invasive Blood Pressure or Temperature

M3012A hemodynamic MMS extension

measurement, optionally with Cardiac Output and/or Continuous Cardiac Output.

IntelliVue Anesthetic Gas Modules

Versatile IntelliVue G1 and G5 Gas Modules measure the five most commonly used anesthetic gases, as well as N_2O and CO_2. They all provide inspiration and expiration values and calculate MAC values for display on Philips IntelliVue patient monitors. The IntelliVue G1 Gas Module measures the single agent chosen by the clinician. The IntelliVue G5 features automatic agent identification and mixed-agent measurement capability. Advanced O_2 technology based on paramagnetic measurements is optional with the G1 and included standard with the G5. Additionally, AGM (Anesthetic Gas Module) offers auto-ID and single agent measurement capabilities.

Remote Alarm Device

The Remote Alarm Device can be connected to an external device interface connection on the monitor and mounted in a conspicuous position to improve the visibility of alarm signals generated by the monitor.

The device has three optical alarm indicators, an integrated speaker to transmit audible alarm signals, and an On/ Standby key to remotely switch the monitor on or put it into standby.

Remote Alarm Device

Remote SpeedPoint

The remote SpeedPoint can also be connected to an external device interface connection on the monitor. It combines joystick with dial control and enables full two-dimensional navigation across the monitor screen. A tactile resistance at every step gives the user control over cursor movement.

Integrated Module Slots

The monitors have four integrated module slots for use with the plug-in modules.

1. only available in selected geographies
2. Microstream is a registered trademark of Oridion Systems Ltd.

Plug-In Modules

Individual plug-in measurement modules are available to measure:

- M1006B Invasive Blood Pressure
- M1029A Temperature
- M1012A Cardiac Output/ Continuous Cardiac Output
- M1014A Spirometry
- M1018A Transcutaneous Gas
- M1020B Oxygen Saturation of Arterial Blood (SpO_2)
- M1027A Electroencephalograph (EEG)
- M1034A Bispectral Index (BIS™)[1]

Side view of MP40/MP50 with MMS and MMS extension (top), and plug-in recorder module and two measurement modules below

Additional plug-in modules available are:

- M1116B Thermal Array Recorder
- M1032A VueLink Device Interface.

Mounting

The mounting options available enable flexible, space saving placement of the monitors for an ergonomic work space.

1. Bispectral Index and BIS are registered trademarks of Aspect Medical Systems, Inc.

Application Features

Critical and Cardiac Care Features

- The monitor performs multi-lead ***arrhythmia detection*** analysis on the patient's ECG waveform at the bedside. It analyzes for ventricular arrhythmias, calculates heart rate, and generates alarms, including asystole, bradycardia, and ventricular fibrillation.
- Up to 12 leads of ***ST segment analysis*** can be performed on adult patients at the bedside, measuring ST segment elevation and depression and generating alarms and events. The user can trend ST changes, set high and low alarm limits, and set both ST and isoelectric measurement points. Using ST Snippets, one-second wave segments can be compared with a baseline segment for each measured ST lead. ST points can be set either relative to the J-point or directly by selecting a numeric value.
- ***QT/QTc interval monitoring*** provides the measured QT interval, the calculated heart-rate corrected QTc value and a ΔQTc value, which tracks variation in the QT interval in relation to a baseline value.
- ***ST Map*** application shows ST changes over time in two multi-axis spider diagrams.
- ***12-lead ECG*** data can be measured, using either the EASI placement method with five standard electrodes or conventional electrode placement with 10 electrodes.[2]
- 12 realtime ECG waveforms can be displayed simultaneously.
- High performance pulse oximetry technologies perform accurately even in cases with low perfusion.
- Choice of Microstream, sidestream and mainstream ***CO_2 monitoring*** for high quality measurements with intubated and non-intubated patients.
- A choice of ***cardiac output*** measurements using the right-heart thermodilution method and ***continuous cardiac output*** measurements with advanced hemodynamic assessment provided using the PiCCO™ method without a pulmonary catheter.[3]
- ***Clinical calculations*** enable stored and manually entered data to be used to perform hemodynamic, ventilation and oxygenation calculations. Calculated data is displayed in both indexed and non-indexed format.
- The ***Drug Calculator*** helps you to manage intravenous (IV) drug infusions by calculating drug dose, rate, amount, volume, concentration, and standardized rate. Using the support tool, the drug calculator can be configured to include a list of commonly used drugs.

2. EASI-derived 12-lead ECGs and their measurements are approximations to conventional 12-lead ECGs. As the 12-lead ECG derived with EASI is not exactly identical to the 12-lead conventional ECG obtained from an electrocardiograph, it should not be used for diagnostic purposes.

3. PiCCO™ is a trademark of Pulsion Medical Systems AG.

- ***Basic Event Surveillance*** automatically detects changes in patients' condition and stores an electronic record of data called an episode, providing you with 20 minutes of data sampled every 12 seconds. Events can be triggered by alarms, by user-configured conditions, or manually by selecting a dedicated SmartKey. Event Annotation allows immediate or retrospective annotation of events using a user-defined list of event markers, such as "ventilated".
- Events can be stored in a database for retrospective review and documented in a report or on a recording.

Anesthesia Features

The ***IntelliVue G1 and G5 and the Anesthetic Gas Module*** (AGM) measure the five most commonly used anesthetic gases, as well as N_2O and CO_2.

- The integrated ***BIS*** module assesses the level of consciousness in the OR, providing a measure of the effect of anesthetic agents.
- ***VueLink*** provides an external device interfacing capability to Anesthesia Machines and other external instruments which have a serial RS-232 and/or analog output. It generates alarms and provides up to two waves and six numerics, depending on the device.
- The ***EEG*** module determines coma prognosis and extent of cerebral insult. CSA information can be either permanently displayed on specially designed screens or viewed in a separate window.
- ***Screens*** provide flexible viewing of patient information during different procedures or phases of an anesthesia case.
- The ***Spirometry Module*** provides airway pressure, volume and flow measurements.
- ***Respiratory Loops***
  The IntelliVue Patient monitor can generate three types of respiratory Loops:
  - Pressure-Volume Loop
  - Pressure-Flow Loop
  - Volume-Flow Loop

The monitor can display one real-time loop and up to 6 stored loops simultaneously. This assists in early detection of patient airway problems (e.g. atelactasis, bronchospasm) and ventilator problems (e.g. leaks and kinked tubes).

Neonatal Monitoring Features

- Transcutaneous gas (***TcGas***) monitoring helps to optimize respiratory therapy in neonates.
- The ***OxyCRG*** screen provides a simultaneous presentation of up to three trends:
  - beat-to-beat heart rate (btbHR)
  - an oxygenation measurement trend (SpO_2 or $tcpO_2$)
  - compressed respiration wave.

  This customized display gives clinicians a convenient overview of the neonatal patient's most important vital signs, helping them to identify significant events.

  Continuous OxyCRG recordings can be made at the bedside on the M1116B Recorder, and reports can be printed on locally or centrally-connected printers.
- ***Neonatal Event Review*** (NER) is optimized for monitoring neonatal patients.
  For each event, an episode of four minutes of data sampled four times a second is stored, to help you keep a record of rapidly-changing condition of neonatal patients. Combi-events correlate apnea events with bradycardia and/or desaturations.

Ease of Use

- ***Screen layouts*** are easily adjustable, allowing flexible display of measurement information.
- Previous/Next Screen function provides access to the ten most recently modified screens.
- Temperature, height, and weight can be configured either in metric or imperial ***Units***. Pressure measurements can be displayed in kPa or mmHg. Gases can be displayed in kPa, mmHg.
- The ***Computer-Based Training*** supplied with each monitor provides a flexible, low-cost training in using the monitor, basic measurements and Cardiac Output.

IntelliVue Applications

Clinical Decision Support

Clinicians are continuously drawing mental images from their observations of patients' vital signs. The IntelliVue's clinical decision support applications offer this dynamic "minds eye view" directly on the monitoring screen display.

ProtocolWatch

ProtocolWatch allows clinicians to run clinical protocols that can monitor developments in the patient's condition. The SSC Sepsis Protocol runs on the ProtocolWatch application and is used in screening for severe sepsis and monitoring its treatment.

ST Map

ST Map provides a graphical display that can help clinicians to recognize ST changes and their location in the heart more easily. ST Map collects ST values created from the frontal (limb leads) and

horizontal (chest leads) plane into an integrated display. The maps are multi-axis portraits of the patient's ST segments as measured with the ST/AR arrhythmia algorithm.

Horizon display

Horizon trends provide clinicians with a graphical visualization tool that allows the end user to detect at a glance the patients' current clinical status. By combining parameters together on the display, the clinician is assisted in their cognitive process of pattern recognition.

Trends

- The ***trend database*** stores patient data from up to 16 measurement numerics. The measurement information can be sampled every 12 seconds, 1 minute, or 5 minutes, and stored for a period ranging from four to 48 hours.
- ***Tabular Trends*** (Vital Signs) show data for up to 16 measurement numerics in tabular form. Tabular Trends can either be viewed in a separate window or permanently displayed on specially designed screens.
- With ***Graphic Trends***, up to three rows of measurement trends can be displayed in graphic form, each combining up to three measurement. Graphical Trends can either be viewed in a separate window or permanently displayed on specially designed screens.
- ***Screen Trends*** permanently display trend data for periodic and aperiodic parameters in graphical format on special screens. The displayed time period can be set to 30 min, 1 h, 2 h or 4 h.
- ***Horizon Trends*** show the deviation from a stored baseline.
- With ***Event Surveillance***, changes in patients' condition are automatically detected and an electronic record of data called an Episode is stored. The Episode can store
  - 15 seconds of high-resolution wave trace,
  - four minutes of data sampled four times a second, or
  - 20 minutes of data sampled every 12 seconds.

  Event triggers can use the preset alarm limits or they can be user-defined. With user-defined triggers, event episodes are stored even when alarms are paused. A Manual Event SmartKey enables manual episode storage.

  Event Annotation allows immediate or retrospective annotation of events using a user-defined list of event markers such as "ventilated".

  Events can be stored in a database for retrospective review, and episode data including graphic event reviews can be documented on a local or central printer. In addition, episode data without graphic elements can be documented on the M1116B Recorder Module. Events are also marked on the Event Line of an Information Center.

  The ***standard Event Surveillance*** package includes one Event Group plus the OxyCRG Group. Up to 50 event episodes can be stored over a 24 hour-period.

Transport Features

- The monitors' portable design means they can be used for in-hospital transport: a monitor, combined with an MMS, a recorder, and batteries weighs under 8 1/2 kg.
- The monitors can operate using battery power for 4 to 5 hours, depending on the monitor configuration, to let you safely and easily monitor patients during procedures or in-hospital transfer.
- The transition from bedside monitoring to transport is smooth and easy, with no need to disconnect patient cables or adjust any measurement or monitor settings.
- The monitor's network capability means that it is ready for use as an integrated part of the hospital system.
- Specially-designed mounting solutions let you quickly disconnect the monitor for transport and reconnect to the mount after transport.
- The Universal Admit, Discharge and Transfer (ADT) feature means that all ADT information is shared between the networked monitor and the Information Center. Information need only be entered once.
- Patients can be transferred by disconnecting the MMS from a monitor, and then reconnecting it at a new monitor. Patient demographics are stored in the MMS, so they do not have to be re-entered at the new monitor.

Patient Data Documentation

- An extensive range of ***Patient Reports*** can be printed:
  - Event Review and Episode Reports
  - OxyCRG Reports
  - 12-lead ECG Reports
  - Alarm Limit Reports
  - Vital Signs
  - Graphic Trends
  - Cardiac Output Reports
  - Wedge Procedure Reports
  - Calculations Reports
  - EEG Report
  - Drug Calculator Reports
  - Realtime Wave Reports

  Report templates can be defined in advance, enabling print-outs tailored to each hospital's specific requirements to be started quickly. Reports can be printed on locally or centrally- connected printers, and they can be initiated manually or automatically at user-defined intervals.

Alarms

The alarm system can be configured to present either the traditional HP/Agilent/Philips alarm sounds or sounds compliant with the draft ISO/IEC 9703-2 Standard.

Alarm limits are permanently visible on the main screen. The Alarm Limits page provides a graphic depiction of alarm limits in relation to the currently monitored measurement values and lets you adjust alarm limits. It also lets you preview wide and narrow automatic alarm limits before you apply them.

When an alarm limit is exceeded, it is signalled by the monitor in the following ways:

- an alarm tone sounds, graded according to severity
- an alarm message is shown on the screen, color-coded according to severity
- the numeric of the alarming measurement flashes on the screen
- alarm lamps flash for red and yellow alarms and are illuminated for technical INOPs
- the Remote Alarm Device signals the alarm visibly and audibly.

If the monitor is connected via a network to a central monitoring station, alarming is simultaneous at the monitor and at the Information Center.

The basic nurse call relay has active closed contacts.

Alarms are graded and prioritized according to severity:

- ***Red Alarms**** identify a potentially life threatening situation for a patient.
- ***Yellow Alarms**** indicate conditions violating preset vital signs limits.
- ***Technical Alarms (INOPS)*** are triggered by signal quality problems, equipment malfunction or equipment disconnect.
- The Audio off/Pause Alarms function (equivalent to Silence/Suspend with previous monitor generations) allows the user to switch off alarm tones with one touch or click while retaining visual alarm messages.
  All alarms can be paused indefinitely or for a period of one, two, three, five, or 10 minutes.

  Alarm strip recordings are available on the M1116B Recorder Module or on a centrally-connected recorder.

  Patented automatic alarm limits automatically adapt the alarm limits to the patient's currently measured vital signs within a safe margin defined individually for each patient.

  Visual and/or audible latching and non-latching alarm handling is available.

Profiles

Profiles are predefined configuration settings for Screens, measurement settings, and monitor properties. Each Profile can be designed for a specific application area and patient category, for example OR adult, or ICU neonatal. Profiles enable a quick reaction to patient and care location changes: activating a Profile with a particular patient category (Adult, Pediatric or Neonatal) automatically applies suitable alarm and safety limits and saves time usually spent carrying out a complete set-up procedure.

Profiles can be created directly on the monitor or remotely on a personal computer and transferred to the monitor using the Support Tool. A selection of Profiles for common monitoring situations is provided with the monitor. These profiles can be changed, added to, renamed, or deleted.

Networking Capabilities

The monitor can operate as part of a wired or wireless hospital network system, using the Philips IntelliVue Clinical Network interface.

Other Bed Overview Capability

The alarm status of beds in the same Care Group on the hospital network can be permanently displayed on the screen of each monitor in the Care Group. The user can also view measurement data from all other monitors connected to the hospital network. Other Bed information can either be viewed in a separate window or permanently displayed on specially designed screens. The user can also silence remote bedside alarms when connected to the same clinical network.

Clinical Calculation Set

The clinical calculation set consists of: Hemodynamic, Oxygenation, and Ventilation calculations.

Hemodynamic Calculations:

- Cardiac Index (C.I.) and Continuous Cardiac Index (C.C.I.)
- Stroke Volume (SV)
- Stroke Index (SI)
- Systemic Vascular Resistance (SVR)
- Systemic Vascular Resistance Index (SVRI)
- Pulmonary Vascular Resistance (PVR)
- Pulmonary Vascular Resistance Index (PVRI)
- Pulmonary Vascular Permeability Index (PVPI)
- Pulse Pressure Variation (PPV)
- Left Cardiac Work (LCW)
- Left Cardiac Work Index (LCWI)
- Left Ventricular Stroke Work (LVSW)
- Left Ventricular Stroke Work Index (LVSWI)

• Right Cardiac Work (RCW)
• Right Cardiac Work Index (RCWI)
• Right Ventricular Stroke Work (RVSW)
• Right Ventricular Stroke Work Index (RVSWI)
• Extra Vascular Lung Water Index (EVLWI)
• Intrathoracic Blood Volume Index (ITBVI)
• Global End Diastolic Volume Index (GEDVI)
• Global Ejection Fraction (GEF)

Oxygenation Calculations:

• Arterial Oxygen Content (CaO_2)
• Venous Oxygen Content (CvO_2)
• Arteriovenous Oxygen Content ($avDO_2$)
• Oxygen Availability Index (O_2AVI)
• Oxygen Consumption (VO_2)
• Oxygen Consumption Index (VO_2I)
• Oxygen Extraction Ratio (O_2ER)
• Alveolar-Arterial Oxygen Difference ($AaDO_2$)
• Percent Arteriovenous Shunt (Qs/Qt)

Ventilation Calculations:

• Minute Volume (MINVOL)
• Compliance (COMP)
• Dead Space (Vd)
• Dead Space/Tidal Volume Ratio (Vd/TV)
• Alveolar Ventilation (ALVENT)

Service Features

• The Support Tool helps technical personnel to
  - carry out configuration, upgrades and troubleshooting via the network, or on an individual monitor
  - share configuration settings between monitors
  - back up the monitor settings
  - document configuration settings.

A password-protected Service Mode ensures that only trained staff can access service tests and tasks.

The Configuration Mode is password-protected and allows trained users to customize the monitor configuration.

Device Connections

The monitor can be connected to:

• a Multi-Measurement Module or an X2 and a MMS Extension
• Measurement and recorder modules
• an IntelliVue anesthetic gas module
• an Information Center (for example M3150B)
• a PC
• a slave display (SVGA).

Network Interface

The network interface provides the system with networking capability via a wired or wireless network connection.

Wireless Network

The monitor can function within a wireless infrastructure based on an IEEE 802.11 a/b/g network in the 2.4 GHz / 5 GHz bands (ISM). Additionally the monitor can function within a telemetry infrastructure compatible with the Philips Cellular Telemetry System (CTS) in the WMTS and ISM bands. Additional components are required to complete the system. Please refer to the M3185A IntelliVue Clinical Network Technical Data Sheet for further information.

Parallel Printer Interface

The Parallel Printer Output port can be used to connect any off-the-shelf printer that complies with the specifications.

Flexible Nurse Call Relay

The Flexible Nurse Call Relay board provides a means for alarms generated on the monitor to be signalled on an external device such as a nurse call system, a beeper or a light. It provides three general alarm relays and one power fail alarm. The external device is connected to the alarm relay and alarms are triggered by criteria defined by the user. It has active open and closed contacts and a user-definable delay time.

MIB-ready/RS-232 Interface

MIB, Medical Information Bus (IEEE P1073), is a standard for interfacing medical devices, allowing full integration of these devices. The monitors have a serial MIB/RS-232 interface board with two fully-isolated MIB ports. Both ports can be independently configured to be used for:

- input for connection to a touchscreen
- data export using a computer interface, to an automated anesthesia record keeper or a personal computer (not available in all geographies)
- connection to an IntelliVue anesthetic gas module.

Input Device Interface (2 PS/2 Interfaces)

This interface provides two PS/2 ports to enable the monitor to be connected to off-the-shelf input devices.

Remote Device Interface

This interface is required to connect a Remote Alarm Device and one Remote SpeedPoint to the monitor.

Monitor Specifications

See the individual Data Sheets for measurement module, X2, MMS extension, and parameter module specifications.

Safety Specifications

The monitors, together with the Multi-Measurement Module (M3001A), the X2 Multi-Measurement Module (M3002A) and all modules and MMS extensions, comply with the Medical Device Directive 93/42/EEC (CE_{0366}) and with IEC 60601-1:1988 + A1:1991 + A2:1995; EN60601-1:1990 + A1:1993 + A2:1995; UL 2601-1:1994; CAN/CSA C22.2#601.1-M90; IEC 60601-1-1:2000; EN 60601-1-1:2001; IEC 60601-1-2:2001; EN 60601-1-2:2002.

All applied parts are Type CF unless otherwise specified. They are protected against damage from defibrillation and electrosurgery.

The possibility of hazards arising from software errors was minimized in compliance with ISO/EN14971, EN/IEC60601-1-4.

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.

Physical Specifications

Product	Max Weight	W x H x D
Basic monitoring solution (M8003A/M8004A IntelliVue plus M3001A measurement module), and battery	<8.6 kg <14.8 lb	<365 x 330 x 217 mm
Individual monitoring components		
M8003A/M8004A IntelliVue monitors	<6.0 kg <13.3 lb	<365 x 330 x 217 mm
M3001A Multi-Measurement Module (MMS)	<650 g <1.4 lb	188 x 96.5 x 51.5 mm (7.4 x 3.8 x 2 in)
M3002A IntelliVue X2	1.5 kg (3.3 lb)	< 188 x 99 x 86 mm (7.4 x 3.9 x 3.4 in)
M3014A Capnography Extension	<450 g <0.99 lb	190 x 98 x 40 mm (7.5 x 4 x 1.6 in)
M3015A MMS Extension - Microstream CO_2	<550 g <1.21 lb	188.0 x 96.5 x 38.5 mm (7.4 x 3.8 x 1.5 in)
M3016A MMS Extension - Mainstream CO_2	<450 g <0.99 lb	188.0 x 96.5 x 38.5 mm (7.4 x 3.8 x 1.5 in)
M3012A Hemodynamic MMS Extension	<550 g	98 x 40 x 190 mm
M1013A IntelliVue G1 & M1019A IntelliVue G5	<4000 g <8.8 lb	300 x 85 x 232 mm, (11.81 x 3.35 x 9.13 in)
M1026B Anesthetic Gas Module (AGM)	<8.2 kg <18 lb	370 x 90 x 467 mm (14.6 x 3.5 x 18.4 in)
M8025A Remote Alarm Device	<300 g <0.7 lb	62 x 125 x 63 mm (2.4 x 5 x 2.5 in)
M8026A Remote SpeedPoint	<400 g <0.9 lb	103 x 139 x 63 mm (4 x 5.5 x 2.5 in)

Environmental Specifications

Item	Condition	Range
Temperature Range	Operating	0 to 35°C (32 to 95°F)
	Non-operating	-20 to 60°C (-4 to 140°F)
Humidity Range	Operating	20 % to 85 % Relative Humidity (RH) (non condensing)
	Non-operating	5 % to 85 % Relative Humidity (RH)
Altitude Range	Operating	0 m to 3000 m (10000 ft)
	Non-operating	0 m to 12000 m (40000 ft)
Battery storage		-20 to 50°C (-4 to 122°F)

Performance Specifications

Monitor Performance Specifications		
Power Specifications	Power consumption	<100 W
	Line Voltage	100 to 240 V ~
	Current	1.6 to 0.7 A
	Frequency	50/60 Hz
SVGA Display 12.1 inch	Resolution	800 x 600
	Refresh rate	60 Hz
	Useful screen	246 x 184.4 mm
	Pixel size	0.3075 x 0.3075 mm
Sweep Speeds	6.25, 12.5, 25 and 50 mm/s with ±5 % accuracy (guaranteed only for integrated displays)	
Indicators	Alarms Off	red LED
	Alarms	red/yellow/cyan LED
	On/Standby	green LED
	AC Power	green LED
	Error	red LED
Sounds	Audible feedback for user input. Prompt tone. Two different QRS tones, SpO_2 modulation tone. Four different alarm sounds	
Trends: 12 or 16 numerics @ 12 sec, 1 minute, 5 minute resolution. Multiple choices of number of numerics, resolution and duration depending on application area.		
Event Surveillance	information: trigger condition and time, event classification and associated detailed view of episode data	
	episode data: configurable, includes all current numerics, alarms and inops, and 20 minutes of graphic trend @ 12 sec. resolution	
	capacity (max): 25 events for 8 hours	

Monitor Performance Specifications		
Neonatal Event Review	information: trigger condition and time, event classification and associated detailed view of episode data	
	episode data: configurable, includes all current numerics, alarms and inops, and 4 minutes of high resolution trend	
	capacity (max): 25 events for 8 hours	
Review Alarms Window	Information: all alarms / inops, main alarms on/off, alarms acknowledged and time of occurrence	
	capacity	100 items
Real Time Clock	Range: from: January 1, 1997, 00:00 to: December 31, 2080, 23:59	
	Accuracy: <2 seconds per day (typically)	
	Hold Time: infinite if powered by AC; otherwise at least 48 hours (typical: >72 hours)	
Buffered Memory	Contents: Active settings, trends, snapshots, events, review alarms	
	Hold Time: infinite if powered by AC; otherwise at least 48 hours (typical: >72 hours)	
Restart time: After power interruption, an ECG wave will be shown on the display after 30 seconds maximum.		

Battery Specifications

Two batteries are required to operate the monitor.

Philips high-power battery M4605A, 10.8 V 6000 mAh Lithium Ion.

- Weight: 490 g per battery
- Status LEDs indicate charge status of batteries
- Safety: complies with UL1642 (UL recognised)
- Electromagnetic compatibility: complies with the requirements for FCC Type B computing Device, and EN 61000-4-2 and EN 61000-3
- Communication Standard: complies with the SMBus specification v1.1

Battery Operating Time (New and fully loaded battery):

- With basic monitoring configuration: 5 hours (brightness set to optimum, MMS connected, NBP measurement every 15 minutes)
- With extended monitoring configuration: 4 hours (brightness set to optimum, MMS and MMS extension connected,

NBP every 15 minutes, Recorder, Pressure, Temperature modules connected)

Battery Charge Time:

- When monitor is switched off: 4 hours
  When monitor is in use: 5 to 12 hours, depending on monitor configuration

Interface Specifications

Monitor Interface Specifications		
Network	Standard	IEEE 802.3 10-Base-T
	Connector	RJ45 (8 pin)
	Isolation	1.5 kV
Parallel Printer Port	Standard	IEEE 1284-I
	Connector	DB-25
	Isolation	1.5 kV
Dual PS/2 Inputs	Output Voltage	5 V ±10 %
	Output Current	250 mA (comb. max) to connected PS/2 devices
Dual MIB/RS232	Standard	IEEE 1073-3.2-2000
	Connectors	RJ45 (8 pin)
	Mode	Software-controllable BCC (RxD/TxD cross over) or DCC (RxD/TxD straight through)
	Power	5 V +/-5 %, 100 mA (max.)
	Isolation	1.5 kV
ECG Output/Marker Input (1/4" stereo phone jack with tip, ring, sleeve)		
General	Connector	1/4" phone each with tip, ring, sleeve
	Isolation	500 V

Monitor Interface Specifications		
ECG Output (ring, tip)	Signal Gain	320 to 3200
	Full Scale on Display	3.2 V_{pp}
	Gain Error	<20 %
	Baseline Offset	<150 mV
	Bandwidth	1 to 80 Hz
	Output Impedance	ECG Output (ring): <2.2 KΩ ±20 % ECG Output/Marker Input (tip) <2.5 kΩ ±20 %
	Signal delay	≤30 ms
Marker Input Requirements (tip)	Signal Type	0 to -12 V, negative edge pulse
	Pulse Source Impedance	<7 kΩ
	Pulse Fall Time	<100 µs
	Pulse Duration	>4 ms
Video Interface	SVGA	
	Refresh frequency	60 Hz
	Horizontal Frequency	48.4 kHz
	Resolution	800 pixel x 600 pixel
	Video Signals	0.7 Vpp @ 75 Ohm, HSYNC/ VSYNC Signals TTL
	Connector	15 pin D-SUB
Flexible Nurse Call Relay	Connector	20 pin MDR (Mini D-Ribbon), active open and closed contacts 3.5 mm phone jack, active closed contact only
	Contact	<=100 mA, <=24 V DC
	Isolation	1.5 kV
	Delay	<(Configured Latency +0.5 sec)

Monitor Interface Specifications		
802.11 Bedside Adapter	Wireless Technology	IEEE 802.11 a/b/g
	Frequency Band	2.4 GHz and 5 GHz ISM

Compatible Devices	
Printers	**native** PCL5 capability or higher required e.g. HP DeskJet 2500 C+ (color)

Ordering Information

Ordering information for the M8003A (MP40) and M8004A (MP50) patient monitor is given here. See the individual Data Sheets for detailed ordering information for the measurement modules, MMS extensions, and measurement modules.

Basic Functionality	MP40 (M8003A)	MP50 (M8004A)
General/ICU Configuration[a]	H10	H10
Neonatal Configuration	H20	H20
OR/Anesthesia Configuration	H30	H30
Cardiac Configuration	H40	H40
4 Realtime Wave Segments	A04	A04
6 Realtime Wave Segments	A06	A06

a. One Hxx option and one Axx must be chosen. If AGM or G1/G5 is required, H30 must be ordered.

Application Options

Application Options	M8003A	M8004A
Cardiac Applications		
Basic Arrhythmia	Included	Included
Full Arrhythmia	Included	Included
Support for fourth invasive Blood Pressure	C31	C31
Event Surveillance		
Basic Event Surveillance	C06	C06
Neonatal Applications		
OxyCRG	included	included
Neonatal Event Surveillance (includes OxyCRG)	C04	C04
Full Monitor Customization	included	included
Drug Calculator	C05	C05
Networking software	included	included
Information Portal	C17	C17
Anesthesia OLEH support	C90	C90

ProtocolWatch

Application Options	M8003A	M8004A
Severe Sepsis Screening	P01	P01
SSC Sepsis Protocol	P02	P02

Measurement Options

Measurements		Option
Measurement Modules		
Multi-Measurement Module, for Resp, ECG (inc. EASI), NBP, SpO2 (FAST SpO_2 (#A01), Nellcor OxiMax-compatible (#A02), Masimo SET (#A03)), and Pressure/Temperature. See the MMS Data Sheet for details.	M3001A	A01, A02[a] or A03[a]
Add Press/Temp		C06
Add Press/Temp and Conventional 12 lead ECG		C18
X2 Multi-Measurement Module, for Resp, ECG (inc. EASI), NBP, SpO2 (FAST SpO_2 (#A01), Masimo SET (#A03)), and Pressure/ Temperature. See the X2 Data Sheet for details.	M3002A	A01, or A03[a]
Add Press/Temp		C06
Add Conventional 12 lead ECG		C12
Respironics CO2- ready		C14
MMS Extensions		
Microstream CO_2 Extension	M3015A	
Add Press/Temp		C06
Hemodynamic Extension (with Press, Temp, Press/Temp)	M3012A	
Add C.O.		C05
Add C.O./CCO		C10
Capnography Extension	M3014A	
Add Press, Press/Temp and C.O.		C05
Add Press and Press/Temp		C07
Add Press, Press/Temp and C.O./CCO		C10
Measurement Modules See the individual module Data Sheets for details.		
Invasive Blood Pressure	M1006A/B	
Cardiac Output with CCO	M1012A	
Spirometry	M1014A	
Transcutaneous Gases	M1018A	
SpO_2	M1020B	
EEG	M1027A	
Temperature	M1029A	
VueLink	M1032A	
BIS Module	M1034A	
Thermal Array Recorder	M1116B	
Gas Modules		
IntelliVue G1	M1013A	
IntelliVue G5	M1019A	
Anesthetic Gas Module	M1026B	

a. may not be available in all geographies

The M1021A SvO_2 module may not be used with the MP40/MP50 monitors.

Hardware Options

Hardware Add-Ons	M8003A	M8004A
Add 4 integrated module slots	standard	standard
Battery operation	E25	E25
2 x High Power Lithium-Ion batteries	E26	E26

Interface Options

Interfaces	M8003A	M8004A
Advanced interfacing capability: SVGA Video, Nurse Call Relay and Wireless Network Kit	J40	J40
RS232 Interface (MIB-ready), 2 ports	J13	J13
Parallel Printer Interface	J14	J14
2 PS/2 Interfaces	J22	J22
Remote SpeedPoint Interface[a]	J23	J23
Flexible Nurse Call Relay	J30	J30
802.11 Bedside Adapter	J35	J35
ECG Output Interface	Included	Included
Docking Station Interfacing Capability	J50	J50

a. Required for Remote Alarm Device and for remote input devices (e.g. Remote SpeedPoint, keyboard, mouse, barcode reader).

Related Products

Related Products	Model Number
Input Devices	M8024A
Slimline keyboard with protective cover	M8024A #A01
Mouse; wired	M8024A #B01
Trackball; wired	M8024A #C01
Trackball; wireless	M8024A #C02
off table track mouse wired	M8024A #C03
Remote Alarm Device	M8025A
Connection cables:	1.5 m #HF2 3 m #HF3 10 m #HF6 15 m #HF7 25 m #HF9
Remote SpeedPoint Device	M8026A
Connection cables:	1.5 m #HF2 3 m #HF3 10 m #HF6 15 m #HF7 25 m #HF9

Related Products	Model Number
Support Tool	M3086A #A02
Computer Based Training	
English	M8000-9461E
French	M8000-9462E
German	M8000-9463E
Swedish	M8000-9468E
Japanese	M8000-9470E
External Battery Charger	M8043A
IntelliVue Instrument Telemetry Adapter 1.4 GHz (US)	M2638A
IntelliVue Instrument Telemetry Adapter 2.4 GHz (Non-US)	M2640A

Cables

Length	Description[a]	Product/ Option
Analog Video		
1.5 m	Monitor to Display	M8022A #VA2
3.0 m	Monitor to Display	M8022A #VA3
10.0 m	Monitor to Display	M8022A #VA6
15.0 m	Monitor to Display	M8022A #VA7
25.0 m	Monitor to Display	M8022A #VA9
Interface Cables		
Length	Description[b]	Product/.Option
1.5 m	Monitor to Remote Device	M8022A #HF2
3.0 m	Monitor to Remote Device	M8022A #HF3
10.0 m	Monitor to Remote Device	M8022A #HF6
15.0 m	Monitor to Remote Device	M8022A #HF7
25.0 m	Monitor to Remote Device	M8022A #HF9
MIB RS/232 Cables		
1.5 m	Serial cable	M8022A #SR2
3.0 m	Serial cable	M8022A #SR3
10.0 m	Serial cable	M8022A #SR6
15.0 m	Serial cable	M8022A #SR7
25.0 m	Serial cable	M8022A #SR9
Nurse Call Relay Cable		
3.0 m	standard (backward compatible) nurse paging relay cable[c]	M8022A #NC3
10.0 m	cable	M8022A #NC6
ECG Out Cable		
3.0 m	standard ECG out cable[d]	M8022A #SY3
25 m	ECG Sync Extension cable	M1181 #A6A
Wireless LAN Adapter Cable		
0.3 m	Y-Piece, DC supply plus LAN	M8022A #WLO

a. Both ends terminated with HDSUB15 (VGA) connectors.
b. Both ends terminated with straight MDR connectors.
c. One end terminated with phone plug; other end w/o connector.
d. Both ends terminated with 1/4" phone plug.

Mounting Information

For mounting hardware, contact your local Philips sales representative. For GCX mounting hardware information, see www.gcx.com/philips.

Support Tool M3086A

Available on CD-ROM, orderable via GWS. Part Number: M3086-10813

Upgrade Options M8003AU/M8004AU

Options	MP40 M8003AU	MP50 M8004AU
Waves		
Upgrade from 4 to 6 waves	A06	A06
Interfaces		
Serial interface / MIB-ready (2 ports)	J13	J13
Parallel Printer Interface	J14	J14
PS/2 Interface (2 ports)	J22	J22
Interface for Remote Device Interface	J23	J23
Flexible Nurse Call Relay	J30	J30
802.11 Bedside Adapter	J35	J35
Advanced System Interface feat. Video, Nurse Call Relay and Wireless Network Kit	J40	J40
Docking Station Interfacing Capability	J50	J50
Clinical Applications		
Neonatal Event Review	C04	C04
Drug Calculator	C05	C05
Event Surveillance	C06	C06
Information portal	C17	C17
Support of fourth invasive pressure	C31	C31

Options	MP40 M8003AU	MP50 M8004AU
Anesthesia OLEH support	C90	C90
Hardware Add-On		
Four internal module slots	E12	E12
Battery Operation	E25	E25
Severe Sepsis Screening	P01	P01
Sepsis Screening + SW Upgrade	P41	P41
SSC Sepsis Protocol	P02	P02
SSC Sepsis Protocol + SW & HW Upgrade	P42	P42

Documentation

All documentation is available in .pdf format on documentation CD-ROM. Additionally, a printed copy of the Instructions for Use ships with each monitor.

- Instructions for Use (printed)
- Installation and Service Guide
- Configuration Guide
- Online Help
- Documentation CD-ROM

Training Material

Interactive Computer Based Training, featuring all Basic Measurements and Cardiac Output, with scoring. Available in English, French, German, Swedish and Japanese. Training video for basic skills.

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M8003A and M8004A comply with the requirements of the Council Directive 93/42/EEC of 14 June 1993 (Medical Device Directive).

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