

Measurements to guide your patient care

Technical data sheet

The Efficia CM Series patient monitors help you with monitoring, analyzing, recording and alarming multiple physiological parameters, at the bedside for adult, pediatric and neonatal patients. The monitors can also help you in transport situations within your facility.

The Efficia CM12 patient monitor provides you with information on ECG, basic arrhythmia, ST analysis, QT/QTc interval, SpO₂ (Philips FAST SpO₂, Masimo rainbow SET*, or Nellcor OxiMax) noninvasive blood pressure, dual temperature and impedance respiration. Depending on the options you order, the monitors can also help you measure:

- Dual invasive blood pressure
- Cardiac output
- Sidestream CO₂ (Respironics LoFlo, Respironics CapnoTrak and Microstream) or Mainstream (Respironics Capnostat)
- 12-lead ECG
- Enhanced arrhythmia analysis

Features and benefits

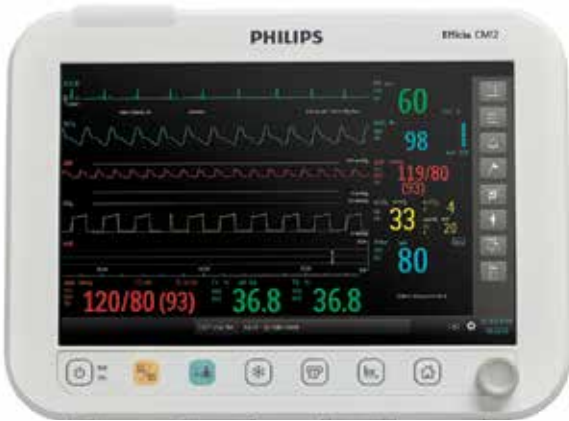
- 12-inch color screen with large numerics and waveforms (touchscreen optional)
- Easy selection of different display layouts
- Retrospective clinical information review from up to 240-hours of tabular and graphical trends, and optional 48-hours full disclosure
- Lithium-ion battery with practical access slots to make it easy to change the battery (with a standard, flat-head screwdriver)
- Audible and visual alarm indicators
- Compatible with a wide range of Philips supplies and accessories
- Connectivity to central station
- Manual and automatic night mode to promote a quiet care unit during evening hours.
- Optional early warning scoring (EWS): is an assessment tool used to help recognize the early signs of deterioration in medical patients and trigger an appropriate response. When the score reaches a predefined threshold, this triggers the recommendation for the clinicians ranging from making more frequent assessments to calling a rapid response team.
- Interface to other systems using HL7 data over the serial connection, or LAN/optional WLAN
- Password-protected administrator and maintenance
- Easy software upgrades over the USB port
- Automatic or prompted patient ID entry using the optional barcode scanner support
- Optional integrated recorder for easy printing of patient data
- Optional roll stand, or wall mounts
- Optional assisting venous puncture
- Optional calculator applications: Hemodynamics, oxygenation, drug, Renal

* Masimo products may not be available in all countries. Check with your local sales organization

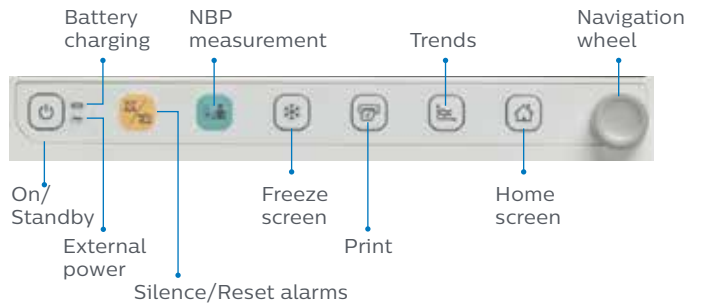
Main components

Display

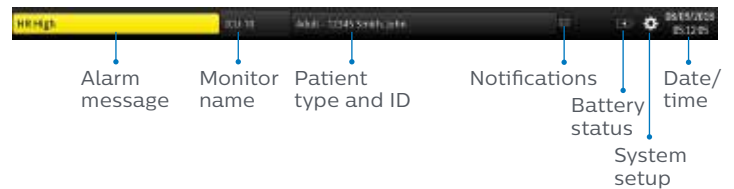
The Efficia CM12 patient monitor gives you a 12-inch color LCD display (touchscreen optional).



The front panel also has the following












The status bar shows you the following information



User interface

The main screen shows the numeric parameter values, real-time waveforms, alarm messages and the system toolbars. To access the menus and settings associated with a measurement, use the navigation wheel or optional touchscreen to select the corresponding waveform or numeric values.

The buttons on the system toolbar on the display give you fast access to the following functionalities:

-  **Screen layout**
Select the layout of the main screen
-  **Trends**
See the parameter data in a graphical or tabular trend
-  **Alarm settings**
Change alarm limit settings for all parameters on the screen
-  **Event marking**
Mark an event that can be later reviewed in the Alarm/Event tab of Trend Review
-  **Record (optional)**
Record patient data
-  **Manage patient**
Admit, discharge or edit patient data
-  **NBP venous puncture (optional)**
Start NBP venous puncture cuff inflation
-  **Night mode***
Place monitor into night mode
-  **Calculator applications**
Hemodynamics, oxygenation, drug, renal calculations

* If you have activated night mode.

** Wireless radio may not be available in all countries. Check with your local sales organization.

Device connections

- USB port (complies with the USB 2.0 standard as a full-speed host) to:
 - Upgrade software
 - Connect to a barcode scanner or a serial interface adapter
 - Export tabular trend data
- Ethernet port to
 - Export HL7 data (option)
 - Connect the monitor to the central station
- Wireless connectivity**
 - Option E20 enables the monitor to access the EMR using the customer's existing wireless infrastructure. The monitor supports the following wireless standards: IEEE802.11a, 802.11b, 802.11g and 802.11n, operating in the 2.4 GHz or 5 GHz bands.
- EMR connectivity
 - Via LAN
 - Via WLAN

Safety standards

IEC 60601-1	IEC 60601-2-27	ISO 80601-2-55
EN 60601-1-2	IEC 80601-2-30	ISO 80601-2-56
IEC 60601-1-2	EN 80601-2-30	ISO 80601-2-61
IEC 60601-1-6	IEC 60601-2-34	IEC 62304
IEC 60601-1-8	EN-60601-2-34	IEC 62366
IEC 60601-2-26	IEC 60601-2-49	

- Protection class: class I, internally powered equipment, per EN/IEC 60601-1
- Degree of protection: type CF defibrillator-proof, per EN/IEC 60601-1
- Type CF defibrillator-proof
- BIS: Type BF defibrillator-proof
- IPX1 Ingress protection against vertically falling water drops
- Protection against hazards of ignition of flammable anesthetic mixtures: equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or oxygen or nitrous oxide, per IEC 60601-1



Physical specifications

- Width: 33 cm (12.9 in)
- Height: 25 cm (9.8 in)
- Depth: 18 cm (7.1 in)
- Weight (with no battery): <5.0 kg (11.0 lb)
- Display
 - Type: 30.7 cm (12.1 in) LCD
 - Resolution: 1280 active pixels/line, 800 active lines/frame
 - Viewing angle: $\pm 15^\circ$

Battery

- Weight, 3-cell, lithium-ion: 0.25 kg (0.55 lb)
- Weight, 9-cell, lithium-ion: 0.5 kg (1.1 lb)

Environmental specifications

CM12

- Water ingress: IPX1
- Operating temperature: 10° to 40° C
- Storage temperature: -20° to 50° C
- Operating/storage relative humidity: 15° – 90% RH, non-condensing
- Atmospheric pressure: 1013 – 701 mbar, 0 – 3000 meters, 0 – 9842 feet above sea level

Mechanical shock

Complies with mechanical shock requirement according to ISO 9919/IEC 80601-2-61 standards, for use within the healthcare facility. Test conditions include:

- Peak acceleration: 150 m/s² (15.3 g)
- Duration: 11 ms
- Pulse shape: half sine
- Number of shocks: 3 shocks per direction per axis (18 total)

Mechanical vibration

Complies with mechanical vibration requirement according to ISO 9919/IEC 80601-2-61 standards, for use within the healthcare facility. Test conditions include:

- Frequency range: 10 – 2000 Hz
- Resolution: 10 Hz
- Acceleration amplitude:
 - 10 – 100 Hz: 1.0 (m/s²)²/Hz
 - 100 – 200 Hz: -3.0 dB/octave
 - 200 – 2000 Hz: 0.5 (m/s²)²/Hz
- Duration: 10 minutes per each perpendicular axis (3 total)

Mechanical shock

- Peak acceleration: 50 gram
- Duration: ≤ 3 msec
- Pulse shape: half sine
- Number of shocks: one shock on each axis (six total)

Mechanical vibration

- 0.30 gram RMS
- Frequency range: 5 – 500 Hz
- Acceleration amplitude:
 - 5 – 350 Hz: 0.0002 g²/Hz
 - 350 – 500 Hz: -6 dB/octave
- Duration: ten minutes per each perpendicular axis

Electrical specifications

- Internal battery: 9-cell or 3-cell lithium-ion battery, 10.8 – 11.1 V
- Dual battery option
- Battery operating time (new, fully-charged battery, monitoring ECG, SpO₂ and NBP measured at 15-minute intervals)
- Up to 6 hours with single 9-cell battery
- Up to 13 hours with dual 9-cell batteries (For dual 9-cell batteries, touchscreen option is required)
- Battery charge time: <5 hours (to charge to 90%, while the unit is monitoring with ECG, SpO₂ and making an NBP measurement every 15 minutes)
- Internal power supply: 100 – 240 Vac
- Power consumption: <75 watts
- Frequency: 50/60 Hz

Full disclosure (option)

- Displays the latest 48 hours of waveforms and parameters
- User-configurable waveform selection
- User-configurable waveform review sweep speed

ST Map (option)

ST Map collects ST values created from the frontal (limb leads) and horizontal (chest leads) planes into an integrated, graphical display. This shows changes in the patient's ST segments over time, as measured with the Philips ST/AR arrhythmia algorithm, in two multi-axis spider diagrams. This can simplify your recognition of ST changes, and their location in the heart.



Mounting options

Efficia CM12

The Efficia CM Series monitors have the following mounting options:

- Roll stand: 989803176601
- Wall mount, 10-inch: 989803195571
- Wall channel: 9019
- Bedrail hook: option E16: 989803199711

Recorder

- Channels: 4
- Recorder type: thermal
- Paper width: 58 mm
- User selectable speeds: 6.25, 12.5, 25 and 50 mm/s

Application features

- Mode of operation: continuous

Alarms

- Three alarm severity levels (high, medium, low) with corresponding visual and audio indicators
- Configurable alarm limits
- User can activate “auto alarm limits”, to set alarm limits based on the patient's current vital sign values
- Visual alarm indicators, including an alarm LED, flashing numeric panes, alarm messages and alarm icons
- Audible alarms, configurable for volume, tone and silence
- Alarm audio range: 45 – 85 dB, ± 3 dB tolerance
- Ability to latch all physiological alarms

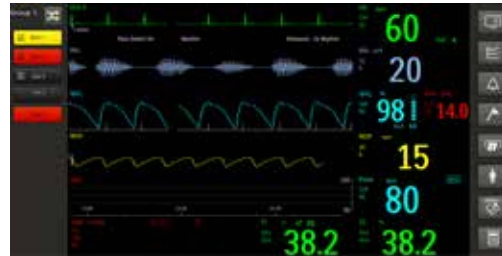
Trends

- Collect and store graphical and tabular trend data (up to 240 hours)
- Mark an event – to easily find corresponding trends
- Export trend data using HL7 over LAN or WLAN
- User-configurable display interval
- User-configurable printout intervals and content

Bed-to-Bed overview

Bed-to-Bed overview as a standard feature and can be used with or without a central station on the network. Monitors assigned to the same Bed-to-Bed group share alarms and parameter information.

Clinicians can quickly evaluate the status of all patient in the group by looking at the screen of one of the monitors in that group.



Pulse Pressure Variation (PPV)

PPV is a standard feature for monitors configured with the B10 invasive blood pressure option.

Clinicians can use PPV to get an indication of the patient's blood volume and to assess the need of fluid replacement therapy.

Night Mode

The night mode function allows the clinician to configure the patient monitor's screen brightness and the speaker volume. This allows the hospital to reduce noise and light pollution, specially during the evening hours.

Early Warning Scoring (EWS)

An early warning score is an assessment tool used to help recognize the early signs of deterioration in medical patients and trigger an appropriate response. When the score reaches a predefined threshold, this triggers the recommendation for the clinicians ranging from making more frequent assessments to calling a rapid response team. The EWS application support protocols like MEWS, NEWS2, QSOFA, as well as user-defined protocols.



Measurement specifications

ECG

- Heart rate range
 - Adult: 15 – 300 bpm
 - Pediatric and neonatal: 15 – 350 bpm
- Heart rate accuracy: $\pm 1\%$ or ± 1 bpm, whichever is greater
- QT/QTc interval accuracy: ± 30 ms
- Bandwidth
 - Normal monitoring: 0.67 – 40 Hz
 - Filtered monitoring: 0.67 – 20 Hz
 - Extended monitoring: 0.05 – 100 Hz
- Leads
 - Efficia CM12: 3-lead, 5-lead and 12-lead (optional)
- Display sweep speeds: 12.5, 25 and 50 mm/s
- Pace pulse detection: indicator of pace pulse on waveform display (user-selectable)
- ECG size (sensitivity): 4.0, 2.0, 1.0, 0.5, 0.25 cm/mV or Auto
- Lead off condition detected and displayed
- Single-ended input impedance: $>2.5 \text{ M}\Omega$
- Common mode rejection ratio (CMRR): $>86 \text{ dB}$ (with $51 \text{ k}\Omega/47 \text{ nF}$ imbalance)
- Input signal range: $\pm 5 \text{ mV}$

ECG arrhythmia

- Respiration excitation waveform: $<250 \text{ }\mu\text{A}$, 37 kHz nominal
- Time to alarm for tachycardia: <5.0 seconds
- Tall T-wave rejection capability: tested to a T-wave amplitude of 1.8 mV
- Three different heart rate averaging methods are used:
 - Normally, by averaging the 12 most recent R to R intervals.
 - For runs of PVCs, up to 8 R to R intervals are averaged.
 - If each of three consecutive R to R intervals is greater than 1200 ms (that is, rate less than 50 bpm, 80 bpm for neonates), then the four most recent R to R intervals are averaged.
- Response time of heart rate meter to change in heart rate (HR change from 80 bpm to 120 bpm, or change from 80 bpm to 40 bpm): 10 seconds maximum
- Heart rate meter accuracy and response to irregular rhythm:
 - Ventricular bigeminy: 80 bpm
 - Slow alternating ventricular bigeminy: 60 bpm
 - Rapid alternating ventricular bigeminy: 120 bpm
 - Bidirectional systoles: 90 bpm
- Accuracy of input signal reproduction: methods A and B were used to establish overall system error and frequency response
- Time to alarm for cardiac standstill: <10 seconds
- Time to alarm for low heart rate: <10 seconds
- Time to alarm for high heart rate: <10 seconds
- Pacemaker pulse rejection: rejects $\pm 2 \text{ mV}$ to $\pm 700 \text{ mV}$; Pulse widths 0.1 – 2.0 ms; with no overshoot (Meets AAMI EC13 using test method A)
- Pacer pulse detector rejection of fast ECG signals with a 5mV input, a minimum slew rate of 1V/s. RTI will trigger the pace pulse detector

Impedance respiration

- Technique: transthoracic impedance
- Measurement range: 3 – 150 rpm
- Resolution: 1 rpm
- Accuracy:
 - ± 1 rpm in the range 3 – 120 rpm
 - ± 2 rpm in the range 121 – 150 rpm
- Respiration excitation waveform: $<250 \text{ }\mu\text{A}$, 37 kHz nominal
- ECG leads used: RA to LL
- Display sweep speeds: 6.25, 12.5, 25, 50 mm/s
- Lead off condition detected and displayed

Philips SpO₂

- Measurement range
 - SpO₂: 0 – 100%
 - SpO₂ resolution: 1%
 - Pulse rate: 30 – 300 bpm
 - Pulse rate resolution: 1 bpm
- Pulse rate accuracy: 2% or 1 bpm, whichever is greater
- SpO₂ accuracy* (within the range 70 – 100%), Philips reusable sensors
 - $\pm 2\%$ – M1191B, M1191BL, M1192A,
 - $\pm 3\%$ – M1193A, M1194A, M1195A, M1196A, M1191T, M1192T, M1196T, M1196S
 - $\pm 4\%$ – M1193T (neonatal)
- SpO₂ accuracy* (within the range 70 – 100%), Philips disposable sensors
 - $\pm 3\%$ – M1131A, M1133A, M1134A (neonatal)
 - $\pm 2\%$ – M1132A, M1133A, M1134A (adult/infant)
- SpO₂ accuracy* (within the range 70 – 100%), Efficia sensors
 - $\pm 3\%$ – 989803160631, 989803160621, 989803160611
- Wavelength range**: 500 – 1000 nm for all specified sensors
- Maximum optical output power: $\leq 15 \text{ mW}$ for all specified sensors

Invasive blood pressure

- Measurement range: -40 to 360 mmHg
- Input sensitivity: $5 \text{ }\mu\text{V/V/mmHg}$
- Zero static offsets: up to $\pm 200 \text{ mmHg}$ with $\pm 1 \text{ mmHg}$ accuracy
- Gain accuracy
 - Accuracy: $\pm 1\%$
 - Drift: less than $0.05\%/^{\circ}\text{C}$
- Overall accuracy (including transducer): $\pm 4 \text{ mmHg}$ or $\pm 4\%$, whichever is greater
- Volume displacement of CPJ840J6: $0.2 \text{ mm}^3/100 \text{ mmHg}$
- Warm up time of equipment and transducer: <15 seconds

*Sensor accuracy was obtained by performing controlled hypoxia studies on healthy, non-smoking adult volunteers (according to EN ISO 9919). The SpO₂ readings have been compared to CO-oximeter measurements on arterial blood samples. To represent the general population, data from at least 10 subjects (male and female) with a wide range of skin color was taken to validate SpO₂ accuracy.

**Information about wavelength ranges can be useful for clinicians performing photodynamic therapy.

Noninvasive blood pressure (NBP)

- Technique: oscillometric, using stepwise deflation pressure
- Adult measurement range
 - Systolic: 30 – 270 mmHg (4.0 – 36.0 kPa)
 - Diastolic: 10 – 245 mmHg (1.3 – 32.7 kPa)
 - MAP: 20 – 250 mmHg (2.7 – 34.0 kPa)
- Pediatric measurement range
 - Systolic: 30 – 180 mmHg (4.0 – 24.0 kPa)
 - Diastolic: 10 – 150 mmHg (1.3 – 20.0 kPa)
 - MAP: 20 – 160 mmHg (2.7 – 21.3 kPa)
- Neonatal measurement range
 - Systolic: 30 – 130 mmHg (4.0 – 17.3 kPa)
 - Diastolic: 10 – 100 mmHg (1.3 – 13.3 kPa)
 - MAP: 20 – 120 mmHg (2.7 – 16.0 kPa)
- Blood pressure accuracy
 - Maximum standard deviation: ≤ 8 mmHg
 - Maximum mean error: ± 5 mmHg
- NBP cuff pressure accuracy
 - ± 3 mmHg or 2% of the reading, whichever is greater
- Pulse rate range: 40 – 300 bpm
- Pulse rate accuracy (average over the NBP cycle)
 - 40 – 100 bpm: ± 5 bpm
 - 101 – 200 bpm: $\pm 5\%$ of reading
 - 201 – 300 bpm: $\pm 10\%$ of reading
- Initial cuff inflation
 - Adult: 160 mmHg (21.3 kPa)
 - Pediatric: 140 mmHg (18.7 kPa)
 - Neonatal: 100 mmHg (13.3 kPa)
- NBP intervals: automatic measurements at intervals of 1, 2, 3, 5, 10, 15, 30, 60, 90, 120 minutes and STAT

Temperature measurements

- Measurement range for all measurement sites: 0° to 50° C (32° to 122° F)
- Accuracy $\pm 0.1^\circ$ C – without temperature probe
- Mode of operation: direct mode
- Heating and cooling transient response time: ≤ 150 s

Microstream CO₂

- Measurement range: 0 – 150 mmHg
- Data sample rate: waveform sampling, 20 samples per second
- Flow rate: 50 ml/min, + 15 ml/min, – 7.5 ml/min
- CO₂ waveform resolution: 0.1 mmHg
- etCO₂, imCO₂ resolution: 1.0 mmHg
- Initialization and power-up time: 40 seconds (typical), 3 minutes maximum
- Total response time for adults/pediatrics is approximately 3.9 seconds, for 10% to 90% changes in CO₂ concentration
- The maximum CO₂ response time (with a standard-length FilterLine) is 5.3 seconds (typical).
- Calibration interval: initial calibration after one year or

- 1,200 hours, whichever comes first; then once per year, or every 4000 hours, whichever comes first
- Auto zero interval: once per hour (typical)
- Leak tightness: <250 mBar/min when a 30% vacuum is invoked on the flow system
- Accuracy
 - 0 – 38 mmHg: ± 2 mmHg
 - 39 – 99mmHg: $\pm (5\%$ of reading + 0.08 for every 1 mmHg above 39 mmHg)
 - 100 – 150 mmHg: $\pm (5\%$ of reading + 0.08 for every 1 mmHg above 39 mmHg)
- Respiration rate range: 0 – 150 rpm
- Respiration accuracy
 - ± 1 rpm in the range 0 – 70 rpm
 - ± 2 rpm in the range 71 – 120 rpm
 - ± 3 rpm in the range 121 – 150 rpm
- Automatic barometric pressure: automatic pressure compensation
- Effects of cyclical pressure
 - Overpressure: + 100 cmH₂O
 - Underpressure: –20 cmH₂O

Mainstream CO₂*

- Measurement range: 0 – 150 mmHg**
- imCO₂ measurement range (based on lowest reading over last 20 seconds): 3 – 50 mmHg
- Data sample rate: waveform sampling, 20 samples per second
- CO₂ waveform resolution: 0.1 mmHg
- etCO₂, imCO₂ resolution: 1.0 mmHg
- Initialization time: full specification etCO₂ measurement displays after warm up, in less than 2 minutes
- Total response time: <2 seconds
- Calibration interval: no calibration required
- Auto zero interval: only required when changing the airway adapter style
- Accuracy (gas temperature at 35° C):
 - ± 2 mmHg in the range 0 – 40 mmHg
 - $\pm 5\%$ of reading in the range 41 – 70 mmHg
 - $\pm 8\%$ of reading in the range of 71 – 100 mmHg
 - $\pm 10\%$ of reading in the range of 101 – 150 mmHg
- Respiration rate range: 0 – 150 rpm
- Respiration rate accuracy: ± 1 rpm
- Drift of measurement accuracy:
 - Short-term drift (4 hours of use): does not exceed 0.8 mmHg
 - Long-term drift (120-hour period): retains accuracy specification
- Barometric pressure: configured by system administrator

*Note:

- No degradation due to respiration rate or I:E ratio
- Accuracy is affected by temperature and barometric pressure
- Accuracy specification will be maintained for halogenated anesthetic agents present at clinically accepted MAC (Minimum Alveolar Concentration) levels
- Xenon: the presence of Xenon in the exhaled breath will negatively bias CO₂ values by an additional 5 mmHg at 38 mmHg
- Desflurane: the presence of desflurane in the exhaled breath at concentrations greater than 5% will positively bias CO₂ values by up to an additional 3 mmHg at 38 mmHg
- Ethanol, isopropanol, acetone, methane: CO₂ accuracy will not be affected by the presence of 0.1% ethanol, 0.1% isopropanol, 0.1% acetone, or 1% methane
- Full accuracy specifications will be maintained for all non-condensing humidity levels
- In the presence of interfering gases, the CO₂ measurement meets the ISO 80601-2-55 accuracy requirements. It represents an additional error of ± 4 mmHg in the range of 0–40 mmHg (at sea level)
- Additional error based on the consideration that interfering gas compensation is properly set

**Other measurement units (such as kPa and cmH₂O) are also supported.

Nellcor OxiMax SPO₂

- Range of SpO₂ measurement: 1 – 100%
- Range of derived pulse rate: 20 – 250 bpm
- Perfusion range: 0.03 – 20%
- Pulse rate accuracy: 20 – 250 bpm ± 3 bpm

	SpO₂ range
Nellcor (single-patient use)	70 – 100%
A	± 2.5
P	± 2.5
P (adult)	± 2.5
N (neonate)	± 3.5
I	± 2.5
Nellcor (reusable)	70 – 100%
D-YS (infant to adult)	± 3
D-YS (neonate)	± 4
D-YS with D-YSE ear clip	± 3.5
D-YS with D-YSPD spot clip	± 3.5
DS-100A	± 3
OXI-A/N (adult)	± 3
OXI-A/N (neonate)	± 4
OXI-P/1	± 3

- Contain light-emitting diodes (LEDs) that emit red light at a wavelength of approximately 660 nm and infrared light at a wavelength of approximately 900 nm
- Total optical output power: <15 mW
- Response time:
 - Fast mode: .2 – 4 seconds
 - Normal mode: 6 – 7 seconds

CapnoTrak CO₂

- CO₂ measurement range: 0 – 99 mmHg, 0 – 13.20 kPa, 0 – 134.64 cmH₂O
- etCO₂ and imCO₂ display resolution: 1 mmHg
- CO₂ measurement accuracy (gas temperature at 35° C)
 - 0 – 38 mmHg ± 2 mmHg of actual reading
 - 38.01 – 99 mmHg ± 10% of actual reading
 - All CO₂ levels above 80 bpm: ± 12% of actual reading
- Initialization time:
 - Capnogram display time: less than 10 seconds
 - Full accuracy specification: within three minutes at ambient temperature of 25° C
- CO₂ total system response time: <4 seconds; includes transport time and rise time with water filter assembly and airway adapter
- CO₂ stability (drift of measurement accuracy):
 - Short-term drift: <0.80 mmHg over six hours
 - Long-term drift: accuracy specification will be maintained over a 120-hour period
- Measurement rate: 100 CO₂ samples per second
- No routine calibrations required
- Zero function is provided to remove system drift due to changes in optical or electrical characteristics
- System does not allow a zero under the following conditions:
 - Breaths are being detected
 - Module has not completed warm-up
 - “Accessory disconnected” status is present
- etCO₂ measurement range: 0.5 – 99 mmHg
- etCO₂ accuracy:*
 - 0 – 40 bpm, 0 – 99 mmHg: +0.5 mmHg, -2 mmHg
 - 41 – 70 bpm, 0 – 99 mmHg: +0.5 mmHg, -6%
 - 71 – 100 bpm, 0 – 99 mmHg, +0.5 mmHg, -14%
- imCO₂ measurement range: 0.3 – 50 mmHg
- Respiration rate (RR)
 - Measurement range: 0.2 – 100 bpm
 - Accuracy: ± 1 bmp. Method: eight-breath averaging.
 - Compensations for expired O₂, balance gas (N₂O, He, room air) and anesthetic agents. Uses gas compensation information to correct raw CO₂ value.
- Pressure compensation: automatic correction

* Accuracy is based upon the following conditions:

- Gas mixtures of CO₂, balance N₂, dry gas at 760 mmHg at 25° C.
- Additional error is defined as the deviation from the CO₂ value at 0 bpm.
- Accuracy will be measured using the sampling inlet tube, front panel connector, water filter assembly and large airway adapter at 50 ml/minute flow rate.
- Maximum additional error is verified at 5% and 10% using an I:E ratio of 1:2.

Cardiac output (Right Heart method)

- Measurement range
 - Cardiac output: 0.10 to 20.00 L/min
 - Tblood: 27.0° to 43.0° C
 - Tinj: -1.0° C to 27° C
- Resolution
 - Cardiac output: 0.01 L/min
 - Tblood: 0.1° C
 - Tinj: 0.1° C
- Measurement accuracy
 - Cardiac output (system*): $\pm 5\%$ or 0.2 L/min, whichever is greater, for cardiac output ≤ 10 L/min; $\pm 8\%$ for cardiac output > 10 L/min
 - Tblood: $\pm 0.1^\circ$ C (without probe)
 - Tinj: $\pm 0.1^\circ$ C (without probe)
- Parameters:
 - C.O.
 - Mean CO

Calculators:

- Hemodynamic calculations
- Oxygenation calculations
- Drug calculations
- Renal calculations

* System accuracy is the overall accuracy of the patient monitor and the probes.

Ordering information



863303: Efficia CM12

Basic: 3- and 5-lead ECG, basic arrhythmia analysis, impedance respiration, ST analysis, QT/QTc, Philips NBP, dual continuous temperature, mini-trend 8 hours, LAN connectivity, ECG analog output, night mode, external display connection.

Monitor options: adult/pediatric/neonatal accessory kit (mandatory option), SpO₂ (Philips Fast, Masimo rainbow SET, or Nellcor Oximax, mandatory option), touchscreen, 12-lead ECG, enhanced arrhythmia analysis enhanced arrhythmia analysis, internal recorder, dual IBP, ST map, Sidestream CO₂ (Respironics LoFlo, Respironics CapnoTrak and Microstream) or Mainstream (Respironics Capnostat) cardiac output, full disclosure, HL7 output, wireless LAN connectivity for EMR, assisting venous puncture, barcode support (barcode scanner hardware must be ordered separately), bed rail hook, single or dual 3- or 9-cell lithium-ion battery.

ECG accessories

ECG trunk cables

Part number	Accessories
989803160641	Efficia 3/5-lead trunk cable, AAMI/IEC
989803170171	3-lead trunk cable, OR, AAMI/IEC, 2.7 m (9 ft.)
M1669A	3-lead trunk cable, AAMI/IEC, 2.7 m (9 ft.)
989803170181	5-lead trunk cable, OR, AAMI/IEC, 2.7 m (9 ft.)
M1668A	5-lead trunk cable, AAMI/IEC, 2.7 m (9 ft.)

Reusable 3-lead sets

Part number	Description
989803160651	Efficia 3-lead, grabber, AAMI
989803160661	Efficia 3-lead, grabber, IEC
M1671A	3-lead general use/ICU, grabber, AAMI
M1672A	3-lead general use/ICU, grabber, IEC
M1673A	3-lead general use/ICU, snap, AAMI
M1674A	3-lead general use/ICU, snap, IEC
M1624A	3-lead general use/ICU miniclip, 0.7 m lead, AAMI
M1626A	3-lead general use/ICU miniclip, 0.7 m lead, IEC
M1675A	3-lead OR, grabber, AAMI
M1678A	3-lead OR, grabber, IEC

Disposable 3-lead sets

Part number	Description
989803173121	3-lead, bedside, single patient use, grabber, AAMI
989803174201	3-lead, bedside, single patient use, grabber, IEC

Reusable 5-lead sets

Part number	Description
989803160691	Efficia 5-lead, grabber, AAMI
989803160701	Efficia 5-lead, grabber, IEC
989803160711	Efficia 5-lead, snap, AAMI
989803160721	Efficia 5-lead, snap, IEC
M1968A	5-lead general use/ICU, grabber, AAMI
M1971A	5-lead general use/ICU, grabber, IEC
M1644A	5-lead general use/ICU, snap, AAMI
M1645A	5-lead general use/ICU, snap, IEC
M1647A	5-lead general use/ICU miniclip, AAMI
M1648A	5-lead general use/ICU miniclip, AAMI
M1973A	5-lead OR, grabber, AAMI
M1974A	5-lead OR, grabber, IEC

Disposable 5-lead sets

Part number	Description
989803173131	5-lead, bedside, single patient use, grabber, AAMI
989803174211	5-lead, bedside, single patient use, grabber, IEC

SpO₂ accessories

Reusable 10-lead sets

Part number	Description
M1663A	10-lead, general use/ICU, 2.0 m lead
M1949A	10-lead, general use/ICU, 2.7 m lead

5-lead sets for 10-lead monitoring

Part number	Description
M1976A	AAMI, ICU, grabber, chest
M1978A	IEC, ICU, grabber, chest
M1602A	AAMI, ICU, snap, chest
M1604A	IEC, ICU, snap, chest
M1979A	AAMI, OR, grabber, chest
M1984A	IEC, OR, grabber, chest

ECG electrodes

Part number	Description
40493D	Silver/silver chloride sensor, foam, pre-gelled (5/pack, 300/case)
40493E	Silver/silver chloride sensor, foam, pre-gelled (30/pack, 300/case)
989803148821	Adult, radiolucent, foam
989803192541	Soft cloth, solid gel, small

Philips sensors

Part number	Description	Extension cable
M1191B	Adult finger sensor, for patients >50 kg (110 lb), 2 m cable	M1941A (2 m)
M1192A	Pediatric/small adult finger sensor, for patients 15 – 50 kg (33 – 110 lb), 1.5 m cable	M1941A (2 m)
M1193A	Neonatal foot/hand sensor, for patients 1 – 4 kg (2.2 – 8.8 lb), 1.5 m cable	M1941A (2 m)
M1194A	Adult ear clip sensor, for patients >40 kg (88 lb), 1.5 m cable	M1941A (2 m)
M1195A	Infant finger sensor, for patients 4 – 15 kg (8.8 – 33 lb), 1.5 m cable	M1941A (2 m)
M1196A	Adult finger clip, for patients >40 kg (88 lb), 3 m cable	No extension cable
M1191BL*	Adult finger sensor, for patients >50 kg (110 lb), 3 m cable	No extension cable
M1193T	Neonatal foot/hand sensor, for patients 1 – 4 kg (2.2 – 8.8 lb), 90 cm cable	M1943A (1.1 m) or M1943AL (3 m)
M1196T	Pediatric/adult finger sensor, for patients >40 kg (88 lb), 90 cm cable	M1943A (1.1 m) or M1943AL (3 m)

* Caution: do not connect extension cables to SpO₂ sensors with a part number that ends in L (for example, M1191BL).

Nellcor OxiMax accessories

Philips disposable sensors

Part number	Description	Adapter cable
M1131A	Adult/pediatric finger sensor, for patients >20 kg (44 lb)	M1943A (1.1 m) or M1943AL (3 m)
M1132A	Infant digit sensor, for patients 3 – 10 kg (7 – 22 lb)	M1943A (1.1 m) or M1943AL (3 m)
M1133A	Neonatal foot/hand sensor, for patients <3 kg (7 lb) Infant big toe/thumb sensor, for patients 10 – 20 kg (22 – 44 lb) Adult finger sensor, for patients >40 kg (88 lb)	M1943A (1.1 m) or M1943AL (3 m)
M1134A	Neonatal adhesive-free foot/hand sensor, for patients <3 kg (7 lb) Infant adhesive-free big toe/thumb sensor, for patients 10 – 20 kg (22 – 44 lb) Adult adhesive-free finger sensor, for patients >40 kg (88 lb)	M1943A (1.1 m) or M1943AL (3 m)

Part number	Description	Adapter cable
M1943NL	SpO ₂ adapter cable, 3 meter	N/A
OC-3	Adaptor cable for OxiCliq sensor, 1.2 m (4.0 ft)	N/A
SC-PR	Nellcor preemie SpO ₂ sensor, non-adhesive (single-patient use)	
SC-NEO	Nellcor neonatal SpO ₂ sensor, non-adhesive (single-patient use)	
SC-A	Nellcor adult SpO ₂ sensor, non-adhesive (single-patient use)	
DS100A	Nellcor adult SpO ₂ sensor, reusable (nonsterile), 3.0 ft (0.9 m)	
MAXAL	Nellcor adult XL SpO ₂ sensor (sterile, single-use only), 3.0 ft (0.9 m)	
MAXFAST	Nellcor forehead SpO ₂ sensor, (sterile, single-use only), 0.75 m (2.5 ft)	
MAXN	Nellcor neonatal/adult SpO ₂ sensor, (sterile, single-use only), 0.5 m (1.5 ft)	
MAXI	Nellcor infant SpO ₂ sensor, (sterile, single-use only), 0.5 m (1.5 ft)	Must use M1943NL adapter cable
MAXP	Nellcor pediatric SpO ₂ sensor, (sterile, single-use only), 0.5 m (1.5 ft)	
MAXA	Nellcor adult SpO ₂ sensor, (sterile, single-use only), 0.5 m (1.5 ft)	
MAXR	Nellcor adult SpO ₂ nasal sensor (sterile, single-use only), 0.5 m (1.5 ft)	
OXI-A/N	Nellcor adult/neonatal SpO ₂ sensor with wraps (reusable with adhesive)	
OXI-P/I	Nellcor pediatric/infant SpO ₂ sensor with wraps (reusable with adhesive)	
D-YS	Nellcor SpO ₂ sensor, multi-site, reusable (nonsterile), 1.2 m (4.0 ft)	
D-YSE	Nellcor SpO ₂ ear clip, reusable (nonsterile), 1.2 m (4.0 ft)	
D-YSPD	Nellcor pediatric SpO ₂ sensor clip, reusable (nonsterile), 1.2 m (4.0 ft)	
OxiCliq-P	Nellcor pediatric SpO ₂ sensor, two-piece (sterile, single-use only)	Must use M1943NL adapter cable together with OC-3 adapter cable
OxiCliq-N	Nellcor neonatal/adult SpO ₂ sensor, two-piece (sterile, single-use only)	
OxiCliq-A	Nellcor adult SpO ₂ sensor, two-piece (sterile, single-use only)	

NBP accessories

Reusable Comfort Care cuffs

Part number	Description
M1576A	Thigh
M1575XL	Large adult, extra-long
M1575A	Large adult
M1574A	Adult
M1573XL	Small adult, extra-long
M1573A	Small adult
M1572A	Pediatric
M1571A	Infant

Reusable Easy Care cuffs

Part number	Description
M4559B	Thigh
M4558B	Large adult, extra-long
M4557B	Large adult
M4556B	Adult, extra-long
M4555B	Adult
M4554B	Small adult
M4553B	Pediatric
M4552B	Infant

Disposable Gentle Care cuffs

Part number	Description
M4578B	Large adult, extra-long
M4577B	Large adult
M4576B	Adult, extra-long
M4575B	Adult
M4574B	Small adult
M4573B	Pediatric
M4572B	Infant

Multi Care cuffs

Part number	Description
989803183371	Thigh
989803183361	Large adult
989803183351	Adult, extra-long
989803183341	Adult
989803183331	Small adult
989803183321	Pediatric
989803183311	Infant

Disposable neonatal cuffs (safety connector)*

Part number	Description
M1866B	Size 1
M1868B	Size 2
M1870B	Size 3
M1872B	Size 4
M1873B	Size 5 infant

Disposable soft neonatal cuffs (safety connector)*

Part number	Description
M1866S	Size 1
M1868S	Size 2
M1870S	Size 3
M1872S	Size 4
M1873S	Size 5 infant

* The safety connector cuffs and air hoses may not be available in all countries. Check with your local sales organization.

Disposable single cuffs

Part number	Description
989803182321	Large adult
989803182311	Adult, extra-long
989803182301	Adult
989803182291	Small adult
989803182281	Pediatric

NBP air hoses

Part number	Description
M1598B	NBP hose, 1.5 m
M1599B	NBP hose, 3.0 m
M1596C	Disposable neonatal (regular and soft) NBP hose, 1.5 m
M1597C	Disposable neonatal (regular and soft) NBP hose, 3.0 m

Reusable transducers

Part number	Description
CPJ840J6*	Reusable pressure transducer, 5 μ V/V/mmHg sensitivity
CPJ84022*	Single-use sterile domes (50/case)

Disposable SafeSet kit

Part number	Description
989803180851	152.0 cm tubing, one in-line sampling port, 10 ml in-line reservoir
989803179891	213.0 cm tubing, two in-line sampling ports, 10 ml in-line reservoir

Intubated sampling lines

Part number	Description
M1920A	FilterLine Set, adult/pediatric
M1921A	FilterLine H Set, adult/pediatric
M1923A	FilterLine H Set, infant/neonatal
989803159571	VitaLine H Set, adult/pediatric
989803159581	VitaLine H Set, infant/neonatal
989803160241	FilterLine Set, long, adult/pediatric
989803160251	FilterLine H Set, long, adult/pediatric
989803160261	FilterLine H Set, long, infant/neonatal

Non-intubated oral/nasal sampling lines

Part number	Description
M2526A	Smart CapnoLine, adult/intermediate
M2524A	Smart CapnoLine, pediatric
M2522A	Smart CapnoLine O ₂ , oral-nasal cannula, adult/intermediate
M2520A	Smart CapnoLine O ₂ , oral-nasal cannula, pediatric
989803160281	Smart CapnoLine O ₂ , oral-nasal cannula, long, adult
989803160271	Smart CapnoLine O ₂ , oral-nasal cannula, long, pediatric
989803160301	Smart CapnoLine Plus, long, adult
989803177951	Smart CapnoLine H O ₂ , oral-nasal, adult
989803177961	Smart CapnoLine H O ₂ , oral-nasal, long, adult
989803177971	Smart CapnoLine H O ₂ , oral-nasal, pediatric
989803177981	Smart CapnoLine H O ₂ , oral-nasal, long, pediatric
989803178031	Smart CapnoLine Guard, adult*
989803178041	Smart CapnoLine Guard O ₂ , adult*
989803178051	Smart CapnoLine Guard O ₂ , long, adult*

Non-intubated nasal sampling lines

Part number	Description
M4680A	CapnoLine H O ₂ , nasal, adult
M4681A	CapnoLine H O ₂ , nasal, pediatric
989803178001	CapnoLine H O ₂ , nasal, pediatric infant/neonatal
M4686A	NIV Line, adult
M4687A	NIV Line, pediatric
989803178021	CapnoLine, nasal, infant/neonatal
M4689A	CapnoLine H, nasal, adult
M4691A	CapnoLine H, nasal, infant/neonatal
989803178011	CapnoLine H, nasal, long, infant/neonatal
989803179101	CapnoLine O ₂ , adult
989803179121	CapnoLine O ₂ , pediatric
989803179111	CapnoLine O ₂ , long adult

* ICU medical part number

* For any patient that requires and can tolerate a 60 Fr Bite Block, as recommended by the attending physician.

CapnoTrak Sidestream CO₂ accessories

Part number	Description
989803198891	CO ₂ nasal cannula, large
989803198901	CO ₂ nasal cannula, medium
989803198911	CO ₂ nasal cannula, small
989803198921	CO ₂ /O ₂ nasal cannula, large
989803198931	CO ₂ /O ₂ nasal cannula, medium
989803198941	CO ₂ /O ₂ nasal cannula, small
989803198961	CO ₂ oral nasal cannula, large
989803198971	CO ₂ oral nasal cannula, medium
989803198981	CO ₂ /O ₂ oral nasal cannula, large
989803198991	CO ₂ /O ₂ oral nasal cannula, medium
989803199001	Airway adapter set, ET > 4.0 mm
989803199011	Airway adapter set, ET ≤ 4.0 mm
989803199021	Water filter assembly
989803199031	CO ₂ sampling extension line
989803199041	O ₂ delivery extension line
989803199051	Dehumidification tubing

Mainstream CO₂ accessories

Part number	Description
M2501A	CO ₂ sensor
M2513A	Airway adapter, reusable, adult/pediatric
M2516A	Airway adapter, reusable, infant/neonatal
M2533A	Airway adapter, disposable, adult/pediatric
M2536A	Airway adapter, disposable, infant/neonatal

Cardiac output accessories

Part number	Description
M1642A	Cardiac output interface cable
M1643A	Cardiac output interface cable
23001A	CO-Set injectate temperature probe, reusable, 2.4 m
23001B	CO-Set injectate temperature probe, reusable, 0.5 m
23002A	Temperature probe, ice bath

Temperature accessories

Reusable probes

Part number	Description
21075A	Esophageal/rectal probe (12 Fr)
21076A	Esophageal/rectal probe (10 Fr)
21078A	Attachable skin surface probe

Disposable probes

Part number	Description
21091A	Skin surface probe
M1837A	Esophageal/rectal probe 9 Fr
21090A	Esophageal/rectal probe 12 Fr
21093A	Esophageal stethoscope probe 12 Fr
21094A	Esophageal stethoscope probe 18 Fr
21095A	Esophageal stethoscope probe 24 Fr
M2255A	Foley with temperature probe 14 Fr
21096A	Foley with temperature probe 16 Fr
21097A	Foley with temperature probe 18 Fr
21082B	Adapter 1.5 m
21082A	Adapter 3.0 m

Miscellaneous accessories

Part number	Description
989803176611	2D HS-1 barcode reader (includes mounting arm for use with roll stand)
989803148841	Cable management kit
989803195551	Cable hook kit
989803189981	Lithium-ion battery, 3-cell battery pack
989803194541	Lithium-ion battery, 9-cell battery pack
989803176601	Roll stand
989803136891	Recorder paper (5 rolls)
989803159601	Serial interface adapter
989803195571	Wall mount, 10-inch
9019	Wall channel

* PULSION Medical Systems part number

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