DPM | Series

DPM™ 7

PATIENT MONITOR

Summary of Features

- 17" High Resolution Touchscreen Display
- Wireless 2.4Ghz (802.11g)
- Defibrillator Synchronization
- 120-hours of graph and trends
- 48-hours of full disclosure waveform review
- NIBP recall for 1,000 most recent measurements
- Alarm event review for up to 100 physiological alarm episodes
- Alarm event review for up to 100 arrhythmia alarm episodes
- Connects to DPM CS central station or Panorama® Patient Monitoring Network
- Interfaces with Nurse Call Systems
- 5 built-in module slots
- 8 slot external module rack
- 3, 5 and 12 Lead ECG
- Arrhythmia and ST analysis
- Up to 8 invasive blood pressures
- Non-invasive blood pressure
- SPO_2: DPM, Masimo® or Nellcor®
- CO_2: DPM Sidestream or Oridion® Microstream
- Thermodilution cardiac output and can interface with Vigilance II®
- 2 Temperatures
- 3 Trace recorder
- BIS™
- Respiration
- Respiratory mechanics
- Multi-gas analysis

Powerful, practical and portable

The DPM 7 offers a broad range of patient monitoring capabilities for mid and high acuity departments. Its design incorporates a 17" touchscreen display and functionality to meet the demands of the ICU and OR, such as multi-vector Arrhythmia and ST analysis, Cardiac Output (CO), Continuous Cardiac Output (CCO/SVO_2), CO_2, up to 8 invasive blood pressures, 5-agent multi-gas analysis with auto-ID and data storage. Furthermore, a secondary monitor can be used and independently operated to display different parameters to increase monitoring flexibility.

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DPM | Series

DPM™ 7

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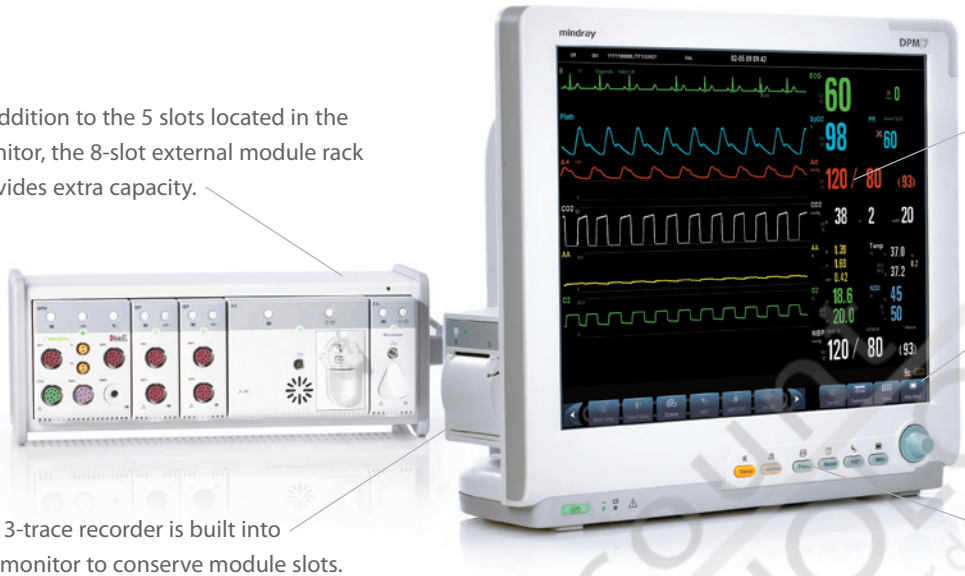

In addition to the 5 slots located in the monitor, the 8-slot external module rack provides extra capacity.

The 3-trace recorder is built into the monitor to conserve module slots. 8 second or continuous real-time recording lengths.

The DPM 7 provides a large numerics display mode to enhance the view of patient data.

12 touchscreen quick-action keys are configurable for commonly used functions.

Quick-action hard keys for frequently used functions.

ECG split-screen feature to view 5-lead ECG while maintaining visibility of other real-time data.

Data storage and recall capabilities

- 120-hours of graph and list trends
- 48-hours of full disclosure waveform review
- NIBP recall for 1,000 most recent measurements
- Alarm event review for up to 100 physiological alarm episodes
- Alarm event review for up to 100 arrhythmia alarm episodes

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DPM | Series

DPM™ 7

TECHNICAL SPECIFICATIONS

Display

Type:	17" color TFT touchscreen
Resolution:	1280 x 1024 pixels
Waveforms:	12 selectable

ECG (3, 5 and 12-Lead)

Leads:	I, II, III, aVR, aVL, aVF, V1-V6
Gain Selection:	x0.125, x0.25, x0.5, x1, x2, x4, auto
Sweep Speed:	12.5mm/sec, 25mm/sec, 50mm/sec
Bandwidth	Diagnostic Mode: 0.05-150Hz Monitor Mode: 0.5-40Hz Surgical Mode: 1-20Hz
Defibrillator Overload Protection:	Withstand 4000VAC/50Hz voltage in isolation against electrosurgical interference and defibrillation
Recovery Time:	<5sec
CMRR:	Diagnostic Mode: ≥90dB Monitor Mode: ≥105dB Surgical Mode: ≥105dB (Notch filter set to off)

Heart Rate Meter

Measurement Range:	Adult: 15-300bpm Pediatric/Neonate: 15–350bpm
Accuracy:	±1bpm or ±1%, whichever is greater
Resolution:	1bpm

Pace Pulse Rejection:

When tested in accordance with the ANSI/AAMI EC13-2002: Sections 4.1.4.1 and 4.1.4.3, the heart rate meter rejects all pulses meeting the following conditions:

Amplitude: ±2 to ±700mV
Width: 0.1 to 2ms
Rise time: 10 to 100µs

Tall T-Wave Rejection:

When tested in accordance with the ANSI/AAMI EC13-2002 Section 4.1.2.1 c, the heart rate meter will reject all 100ms QRS complexes with less than 1.2mV of amplitude, and T-waves with T-wave interval of 180ms and those with Q-T interval of 350ms

Scaling Signal: 1mV ±5%

ST Analysis

Adult/Pediatric Only

Measurement Range:	-2.0mV to 2.0mV
Accuracy:	-0.8 to 0.8mV: ±0.02mV or ±10%, whichever is greater
ST Adjust Scale:	60ms after J point, 80ms after J point (default: 60ms after J point)
ISO Adjust Scale:	4-200ms before R-Wave (default: 80ms) Step: 4ms
J Point Adjust Scale:	4-200ms after R-Wave (default: 48ms)

Pace Pulse

Pulse Indicator:

Pace pulses meeting the following conditions are marked by the PACE indicator:

Amplitude: ±2 to ±700mV
Width: 0.1 to 2ms
Rise time: 10 to 100µs

Pulse Rejection:

When tested in accordance with the ANSI/AAMI EC13-2002: Sections 4.1.4.1 and 4.1.4.3, the heart rate meter rejects all pulses meeting the following conditions:

Amplitude: ±2 to ±700mV
Width: 0.1 to 2ms
Rise time: 10 to 100µs

Arrhythmia Analysis

Adult/Pediatric Only

Asystole, ventricular fibrillation, ventricular tachycardia, pacer non-paced, pacer non-capture, ventricular rhythm, couplet, VT>2, bigeminy, trigeminy, R on T PVC, multiform PVC, irregular rhythm, missed beats, bradycardia, tachycardia

Respiration

Measurement Range:	Adult: 0-120rpm Pediatric/Neonate: 0-150rpm
Resolution:	1rpm
Accuracy:	7-150rpm: ±2rpm or ±2%, whichever is greater 0-6rpm: undefined
Lead:	I or II (default: lead II)
Sweep Speed:	6.25mm/sec, 12.5mm/sec, 25mm/sec

Non-Invasive Blood Pressure

Measurement Method:	Oscillometry
Measurement Modes:	Manual, auto, stat
Units of Measure:	mmHg, kPa (user-selectable)
Resolution:	1mmHg
Systolic Range:	Adult: 40-270mmHg Pediatric: 40-200mmHg Neonate: 40-135mmHg
Diastolic Range:	Adult: 10-210mmHg Pediatric: 10-150mmHg Neonate: 10-100mmHg
Mean Range:	Adult: 20-230mmHg Pediatric: 20-165mmHg Neonate: 20-110mmHg
Accuracy:	Mean error is <±5mmHg Standard deviation is <8mmHg
Cuff Deflation Technique:	Step bleed

DPM™ 7

TECHNICAL SPECIFICATIONS

Non-Invasive Blood Pressure (continued)

Initial Cuff Inflation:	Adult: 160mmHg Pediatric: 140mmHg Neonate: 90mmHg
Over Pressure Protection:	Software overpressure protection
Pulse Rate Range:	40-240bpm
Pulse Rate Accuracy:	±3bpm or ±3%, whichever is greater

Invasive Blood Pressure

Measurement Range:	-50 to 300mmHg
Resolution:	1mmHg
Accuracy:	1mmHg or ±2%, whichever is greater
Zero Offset Range:	±200mmHg
Excitation:	5V DC, ±2%
Frequency Response:	DC to 12.5Hz ±1 Hz, -3db
Waveform Scales:	ART/Ao/UAP/BAP/FAP: 0 to 300mmHg PA: -6 to 120mmHg CVP/UVP: -10 to 40mmHg RAP/LAP/ICP: -10 to 40mmHg IBP1-IBP8: -50 to 300mmHg

Pulse Rate from Invasive Blood Pressure

Measurement Range:	25-350bpm
Resolution:	1bpm
Accuracy:	25-200bpm: ±1bpm or ±1%, whichever is greater 201-350bpm: ±2%

Pulse Oximetry

With Masimo SET® SpO_2

Measurement Range:	1-100%
Resolution:	1%
Accuracy:	±2% (70-100%, Adult/Pediatric, no motion) ±3% (70-100%, Neonate, no motion) ±3% (70-100%, Adult/Pediatric/Neonate, motion) 0-69% unspecified

Pulse Rate with Masimo SET® SpO_2

Measurement Range:	25-240bpm
Resolution:	1bpm
Accuracy:	±3bpm (no motion) ±5bpm (motion)

With Nellcor® SpO_2

Measurement Range and Accuracy*

MAX-A, MAX-AL, MAX-N, MAX-P, MAX-I, MAX-FAST

Range:	70 to 100%
Accuracy:	±2%
Range:	0% to 69%
Accuracy:	Not specified

OxiCliq A, OxiCliq N, OxiCliq P, OxiCliq I

Range:	70 to 100%
Accuracy:	±2.5%
Range:	0% to 69%
Accuracy:	Not specified

D-YS, DS-100A, OXI-A/N, OXI-P/I

Range:	70 to 100%
Accuracy:	±3%
Range:	0% to 69%
Accuracy:	Not specified

MAX-R, D-YSE, D-YSPD

Range:	70 to 100%
Accuracy:	±3.5%
Range:	0% to 69%
Accuracy:	Not specified
Refreshing Rate:	1 s

Pulse Rate with Nellcor® SpO_2

Measurement Range:	20 to 300 bpm
Resolution:	1 bpm
Accuracy:	20 to 250 bpm: ±3 bpm 251 to 300 bpm, not specified
Refreshing Rate:	1 s

With DPM SpO_2

Measurement Range:	0-100%
Resolution:	1%
Accuracy:	±2% (70-100%, Adult/Pediatric, no motion) ±3% (70-100%, Neonate, no motion) ±3% (70-100%, Adult/Pediatric/Neonate, motion) 0-69% unspecified

Pulse Rate with DPM SpO_2

Measurement Range:	20-254bpm
Resolution:	1bpm
Accuracy:	±3bpm (no motion) ±5bpm (motion)

DPM Sidestream CO_2

Measurement Range:	0-99mmHg
Resolution:	1mmHg
Accuracy:	0-40mmHg: ±2mmHg 41-76mmHg: ±5mmHg 77-99mmHg: ±10mmHg

* When the SpO_2 sensor is applied for neonatal patients as indicated, the specified accuracy range is increased by ±1%, to compensate for the theoretical effect on oximeter measurements of fetal hemoglobin in neonatal blood.

DPM™ 7

TECHNICAL SPECIFICATIONS

DPM Sidestream CO_2 (continued)

Start-up Time:	<1min from start-up, module enters warming up status. 1min later, module enters ready-to-measure status (full accuracy mode)
Sampling Rate:	70ml/min or 100 ml/min
Auto-Zeroing Interval:	30sec, 10min and 30min after entering measurement mode and at every odd hour (1, 3, 5, 7, etc.) during operation after that
Respiration	
Measurement Range:	0-120rpm
Respiration Accuracy:	0-70rpm: ±2rpm 71-120rpm

Oridion® Microstream® CO_2

Measurement Range:	0-99mmHg
Resolution:	Numeric: 1mmHg Waveform: 0.1mmHg
Accuracy:	0-38mmHg: ±2mmHg 39-99mmHg: ±5% + 0.08% × (reading - 38mmHg)
Start-up Time:	Approximately 30sec
Sampling Rate:	50ml/min: -7.5ml/min +15ml/min
Auto-Zeroing Interval:	At start-up, and every 12hrs thereafter
Respiration	
Measurement Range:	0-150rpm
Respiration Accuracy:	0-70rpm: ±1rpm 71-120rpm: ±2rpm 121-150rpm: ±3rpm

Anesthesia Gases

Sampling Rate:	Adult/pediatric: 120, 150, 200ml/min Neonatal: 70, 90, 120ml/min
Sampling Delay Time:	<4sec
Refresh Rate:	1sec
Warm-up Time:	45sec to warm-up status 10min to ready-to-measure status
Measurement Range:	CO_2: 0-30% N_2O: 0-100% Des: 0-30% Sev: 0-30% Enf/Iso/Hal: 0-30% O_2: 0-100% awRR: 2-100rpm
Resolution:	CO_2: 1mmHg awRR: 1rpm
Accuracy:	CO_2: 0-1%: ±.1% 1-5%: ±.2% 5-7%: ±.3% 7-10%: ±.5% >10%: unspecified
	N_2O: 0-20%: ±2% 20-100%: ±3%
	Des: 0-1%: ±.15% 1-5%: ±.2% 5-10%: ±.4% 10-15%: ±.6% 15-18%: ±1% >18%: unspecified
	Sev: 0-1%: ±.15% 1-5%: ±.2% 5-8%: ±.4% >8%: unspecified
	Enf/Iso/Hal: 0-1%: ±.15% 1-5%: ±.2% >5%: unspecified
	O_2: 0-25%: ±1% 25-80%: ±2% 80-100%: ±3%
	awRR: 2-60rpm: ±1rpm >60rpm: unspecified
Measurement Rise Time:	Sampling flow 120ml/min, using the DRYLINE™ water trap and neonatal DRYLINE™ 2.5m sampling line CO_2: ≤250ms N_2O: ≤250ms O_2: ≤600ms Hal/Iso/Sev/Des: ≤300ms Enf: ≤350ms Sampling flow 200ml/min, using the DRYLINE™ water trap and adult DRYLINE™ 2.5m sampling line CO_2: ≤250ms N_2O: ≤250ms O_2: ≤500ms Hal/Iso/Sev/Des: ≤300ms Enf: ≤350ms

DPM | Series

DPM™ 7

TECHNICAL SPECIFICATIONS

Data Storage

Trend Data:	120hrs at 1min resolution 1hr at 1sec resolution
Alarm Events:	100 alarm events and associated waveforms
Arrhythmia Events:	100 arrhythmia events and associated waveforms
NIBP Measurements:	1,000 (systolic, diastolic, mean pressure, pulse rate and measurement time)
Full Disclosure Waveforms:	Up to 48 hours

Recorder

Type:	Thermal array
Speed:	25mm/sec, 50mm/sec
# Traces:	3

Interfacing

Connectors:	1 AC power connector 2 RJ45 network connector, 100 BASE-TX 10 USB 1.1 connectors 1 nonstandard USB SMR connector 1 50-pin CF revision 2.0 connector 1 standard DVI-D video interface connector 1 BNC connector 1 equipotential grounding connector 1 RJ11 defib sync connector

Battery

Type:	Rechargeable lithium ion
Number of Batteries:	2
Run Time:	Lithium ion: 2hrs using 2 new, fully charged batteries and monitoring ECG, SpO_2 and auto NIBP measurements every 15min at 25°C
Recharge Time:	6hrs maximum

Physical Dimensions

Monitor Size:	37cm(H) x 40cm(W) x 19.3cm(D) 14.6"(H) x 15.7"(W) x 7.6"(D)
Monitor Weight:	Less than 14.5kg (31.9lbs) including 17" touchscreen display, MPM, AG module, 2 lithium batteries, recorder, and CF components

Environmental

Operating Temperature:	5°C to 40°C (main unit/MPM/IBP module/recorder/CO/CCO, SvO_2) 0°C to 40°C (Microstream CO_2 module) 5°C to 35°C (Sidestream CO_2 module) 10°C to 40°C (AG module)
Storage Temperature:	-20°C to 60°C (main unit/MPM/IBP module/recorder/CO/CCO, SvO_2) -20°C to 60°C (Microstream CO_2 module) -20°C to 60°C (Sidestream CO_2 module) -20°C to 70°C (AG module)
Operating Humidity:	15% to 95%, non-condensing (main unit/MPM/IBP module/recorder/Microstream CO_2 module/Sidestream CO_2 module/AG module)
Storage Humidity:	10% to 95%, non-condensing (main unit/MPM/IBP module/recorder/Microstream CO_2 module/AG module) 15% to 95%, non-condensing (Sidestream CO_2 module)
Operating Atmospheric Pressure:	425-809mmHg (main unit/MPM/IBP module/recorder/CO/CCO, SvO_2) 430-795mmHg (Microstream CO_2 module) 428-790mmHg (Sidestream CO_2 module) 525-900mmHg (AG module)
Storage Atmospheric Pressure:	120-809mmHg (main unit/MPM/IBP module/recorder/CO/CCO, SvO_2) 430-795mmHg (Microstream CO_2 module) 428-790mmHg (Sidestream CO_2 module) 525-900mmHg (AG module)

Power Requirements

AC Voltage:	100 to 240VAC, 50/60Hz
Current:	2.8 to 1.6A

Safety

Type of Protection:	Class I (main unit and secondary display only)
Degree of Protection:	Sidestream CO_2 module/Microstream CO_2 module/AG module: BF MPM/IBP module: CF
Protection Against Ingress of Fluids:	Not protected

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