

## Bedside flexibility and adaptability

The Dash® monitoring family is a portable monitoring system that is flexible and easy to use. Dash allows the acuity of any bed to be modified to meet changing patient needs.

## Gold standard algorithms and technology

Dash monitors revolutionize patient care and assessment by combining the most complete selection of gold standard patient monitoring parameters with leading-edge cardiac technology.

## Enterprise networking

Hard-wired and wireless network connectivity – including access to CIS, CVIS, PACS, RIS, HIS and more than 350 beds without central station support – contributes to the Dash monitors' unprecedented ability to adapt to changing patient acuity demands.

# Dash 3000, 4000 & 5000

## Flexible acuity monitoring



## Product specifications

### Display

Size	Dash 3000 – 8.4 in., Dash 4000 – 10.4 in., Dash 5000 – 12.1 in.
Type	Active-matrix color LCD
Resolution	Dash 3000 and 4000: 640 by 480 dpi, Dash 5000: 800 by 600 dpi
Number of traces	7 (maximum)
Number of seconds/trace	4.9 at 25 mm/sec
Sweep speed	6.25, 12.5, 25 mm/sec (with erase bar)

### Controls

TrimKnob® control	
Five hard keys	Standard Silence Alarm, Print, NBP Go/Stop, Zero All and Power On/Off. Dash 5000 adds Trends, NBP Auto, Admit/Discharge, Standby and Main View
Remote control option	Available

### Alarms

Categories	Patient status and system status
Priority	4 levels – Crisis, Warning, Advisory and Message
Notification	Audible and visual
Setting	Default and individual
Silencing	1 minute, current alarm only
Pause	5 minutes in Adult ICU mode, 3 minutes in Neonatal ICU mode and 5 minute, 15 minute, or permanent pause in OR mode
Volume	Default 70 dB measured at 1 meter

## Invasive blood pressure

Number of channels	1 to 4 (optional)
Transducer sites	Arterial, femoral artery, pulmonary arterial, central venous, right atrial, left atrial, intracranial and special
Transducer requirements	Excitation voltage: 5 V dc $\pm$ 0.1%
Transducer output	5 $\mu$ V/V/mmHg

### Input specifications

Range	-25 mmHg to 300 mmHg
Offset	$\pm$ 150 mmHg

### Output specifications

Frequency response	dc to 50 Hz (-3 dB)
Zero balance range	$\pm$ 150 mmHg
Zero balance accuracy	$\pm$ 1 mmHg
Zero balance drift	$\pm$ 1 mmHg over 24 hours
Accuracy	$\pm$ 2% or $\pm$ 1 mmHg, whichever is greater (exclusive of transducer)
Alarms	User-selectable upper and lower limits for systolic, diastolic and mean pressures

## ECG

Standard leads available	I, II, III, V, aVR, aVL and aVF
3 leadwire	I, II, or III
5 leadwire	I, II, III, V, AVR, AVL, and AVF
10 leadwire	I, II, III, AVR, AVL, AVF, VI, V2, V3, V4, V5 and V6
Leads analyzed simultaneously	I, II, III and V (multi-lead mode)
Lead fail	Identifies failed lead
Alarms	User-selectable upper and lower heart rate limits

## Input specifications

Voltage range	$\pm 0.5$ mV to $\pm 5$ mV
Signal width	40 ms to 120 ms (Q to S)
Heart rate range	30 to 300 bpm
Input impedance	Common mode $> 10$ M $\Omega$ at 50/60 Hz Differential $> 2.5$ M $\Omega$ from dc to 60 Hz Common mode rejection 90 dB minimum at 50 or 60 Hz

## Output specifications

Impulse response	For an impulse of 3 mV applied for 100 ms Displacement following impulse $< 0.1$ mV Slope following impulse $< 0.3$ mV/s
Frequency response	Response of non-permanent displays is limited by resolution to 40 Hz (-3 dB) @25 mm/s. Specified upper frequency limits may vary by $\pm 2$ Hz.
Diagnostic mode	0.67 Hz (+0.4 dB) to 100 Hz (-3 dB)
For compliance with China National Standard	1.0 Hz (+0.4dB) to 75 Hz (-3 dB)
Monitoring mode	0.67 (+0.4 dB) to 40 Hz (-3 dB)
Moderate mode	0.67 (+0.4 dB) to 25 Hz (-3 dB)
Maximum mode	5.0 Hz (-0.3 dB) to 25 Hz (-3 dB)
Noise	$< 30$ $\mu$ V (referred to input)

## Pacemaker detection / rejection

Input voltage range	$\pm 2$ mV to $\pm 700$ mV
Input pulse width	0.1 ms to 2 ms
Rise time	10 $\mu$ s to 100 $\mu$ s
Over/under shoot	2 mV (max)
Baseline drift	$< 0.5$ mV per hour with a $\pm 700$ mV, 2 ms
Pacemaker pulse	Applied

## Respiration

Measurement technique	Impedance variation detection
Range	0-200 breaths per minute for variations of 1.0 – 10.0 $\Omega$
Respiration rate	0-200 breaths per minute
Base impedance	100-1000 $\Omega$ at 52.6 kHz
Detection sensitivity	0.4 to 10 $\Omega$ variation
Waveform display bandwidth	0.1 to 1.8 Hz (-3 dB)
Alarms	User-selectable upper and lower respiration rate limits, and user-selectable apnea limit

## Temperature

Number of channels 2

### Input specifications

Probe type YSI Series 400 or 700 (determined by input cable)

Temperature range 0°C to 45°C (32°F to 113°F)

Resolution  $\pm 0.1^{\circ}\text{C}$

### Output specifications

Parameters displayed T1, T2

Accuracy (independent of source)  $\pm 0.1^{\circ}\text{C}$  for YSI series 400;  $\pm 0.3^{\circ}\text{C}$  for YSI series 700 probes

Alarms User-selectable upper and lower limits for T1, T2

## Cardiac output

### Input specifications

Probe type In-line or bath probe

Catheter size 5F, 6F, 7F, 7.5F and 8F

Injectate volume 3, 5 or 10 cc

### Output specifications

Parameters displayed Cardiac output, blood temperature, injectate temperature and trial number

### Range

Cardiac output 0.2-15 (liters per minute)

Blood temperature 30-42°C

Injectate temperature 0-30°C

### Accuracy

Cardiac output  $\pm 5\%$

Blood temperature  $\pm 0.2^{\circ}\text{C}$

Injectate temperature  $\pm 0.3^{\circ}\text{C}$

Frequency response dc to 15 Hz  $\pm 2$  Hz

## Pulse oximetry

Parameters monitored Arterial oxygen saturation ( $\text{SpO}_2$ ) and peripheral pulse rate (PPR)

$\text{SpO}_2$  range Nellcor 1-100%; Masimo 30-100%; GE Ohmeda 30-100%

PPR range Nellcor 20-300 BPM; Masimo 25-240 BPM; GE Ohmeda 30-250

Accuracy Actual accuracy depends on probe. Please reference manufacturer's specifications.

Nellcor  $\text{SpO}_2 \pm 2$  digits (70-100%  $\text{SpO}_2$ )

Masimo  $\text{SpO}_2 \pm 2\%$  Adults/Pediatric (70-100%  $\text{SpO}_2$ )

GE Ohmeda  $\text{SpO}_2 \pm 2\%$  (70-100%  $\text{SpO}_2$ ),  $\text{SpO}_2 \pm 3\%$  Neonates,  $\leq 69\%$  unspecified

PPR  $\pm 3$  beats per minute

Alarms User-selectable upper and lower limits for  $\text{SpO}_2$  and PPR

## DINAMAP non-invasive blood pressure

Technology	DINAMAP® classic and SuperSTAT™ (SuperSTAT only available with Masimo and Nellcor SpO <sub>2</sub> )
Measurement technique	Oscillometric
Displayed parameters	Systolic, diastolic and mean pressures, time of last measurement
Measurement modes	Adult ICU and OR modes; manual, auto and stat, neonatal mode; manual and auto

### Systolic

Adult	30-285 mmHg
Pediatric	30-235 mmHg
Neonate	30-140 mmHg

### Map

Adult	20-260 mmHg
Pediatric	20-220 mmHg
Neonate	20-125 mmHg

### Diastolic

Adult	10-220 mmHg
Pediatric	10-210 mmHg
Neonate	10-110 mmHg

### Pulse rate, as displayed in tabular trends or 3 wave form display

Adult	30-200 bpm
Pediatric	30-200 bpm
Neonate	30-200 bpm

### Other specifications

Overall system accuracy	Meets or exceeds SP 10-1992 AAMI standards
Automatic cycle times	0-4 hours
Tubing length	12 feet adult, 8 feet neonatal
Automatic cuff deflation	Cycle time exceeding 3 minutes (90 seconds neonatal), French mode – Cycle time exceeding 2 minutes (60 seconds neonatal), power off, or cuff pressure exceeds 294 mmHg ( $\pm 6$ mmHg) adult, 250 ( $\pm 5$ mmHg) pediatric, 147 ( $\pm 3$ mmHg) neonatal
Cuff sizes	Thigh, large adult, adult, small adult, child, infant and neonatal, sizes #5 - #1 and assorted long sizes
Alarms	User-selectable upper and lower limits for systolic, diastolic and mean pressures

## CO<sub>2</sub>

### Technology

Supports Novamatrix CapnoStat (mainstream) and CapnoFlex LF (low-flow sidestream) CO<sub>2</sub> technologies

Principle of operation Non-dispersive infrared (NDIR) single beam optics, dual wavelength and no moving parts

Warm-up time 2 minutes warm-up time to meet accuracy specifications; waveform immediate upon power up, calculated end tidal after two breaths

Cable length (mainstream) 8 foot (2.4 m)

Sample line length (low-flow sidestream) 7 foot (2.1 m)

### Information displayed

Inspired and expired CO<sub>2</sub> concentrations in %, mmHg or kPa; respiratory rate, continuous CO<sub>2</sub> waveform

### Measurement range (at 760 mmHg at an ambient temperature of 25°C)

0-100 mmHg, 0-13%, 0-12.5 kPa

PiCO<sub>2</sub> /FICO<sub>2</sub> 0-50 mmHg, 0-6.5%, 0-6.25 kPa

Respiration rate range Low-flow SS 0-150 breaths/min  
Mainstream 0-120 breaths/min

### Accuracy (at 760 mmHg at an ambient temperature of 25°C)

MS ±2 mmHg or 5%, whichever is greater

SS 0-40 mmHg ± 2 mmHg; 41-70 mmHg ± 5% of reading;  
71-100 mmHg ± 8% of reading; all specifications ± 12% of actual from 80-150 BrPM

Display resolution 1 mmHg

Rise time Less than 200 ms (low-flow sidestream); less than 60 ms (mainstream adult reusable or SPU); less than 50 ms (mainstream infant reusable or SPU)

Respiration rate accuracy ± 1 breath/min

### Compensations

Automatic barometric pressure ± 25 mmHg from 530-785 mmHg

Operator-selectable O<sub>2</sub>/N<sub>2</sub>O compensation

### Calibration

Mainstream No routine user calibration required. 15 second airway adapter zero performed when changing to a different style of airway adapter.

Low-flow sidestream No routine user calibration required

### Airway adapters and sample lines – mainstream (airway adapters)

Types Adult reusable (standard), adult disposable, infant

Deadspace Adult reusable/disposable < 5 cc  
Infant disposable < 1 cc  
Taper meets ISO 5356-1

### Low-flow sidestream airway adapters

Types Adult reusable (standard), adult disposable, infant

Deadspace Adult reusable/disposable < 7.3 cc infant disposable < 1 cc

Adult, pediatric and infant Nasal CO<sub>2</sub> and nasal CO<sub>2</sub>/O<sub>2</sub>

Adult and pediatric Nasal/oral CO<sub>2</sub> and nasal/oral CO<sub>2</sub>/O<sub>2</sub>

### Alarms

CO<sub>2</sub> High inspired CO<sub>2</sub>; high/low expired CO<sub>2</sub>

Respiratory rate Adjustable high and low

### Paper recorder

Method	Thermal dot array
Horizontal resolution	480 dots/in. @25 mm/sec.
Vertical resolution	200 dots/in.
Number of waveform channels	four
Paper width	50 mm (1.97 in.)
Paper length	30 m (100 ft.)
Paper speed	0.1, 0.5, 1, 5, 10, 12.5, 25 and 50 mm/sec. ( $\pm 2\%$ )

### Analog output

#### ECG

Gain	1 V/mV $\pm 10\%$
DC offset	$\pm 100$ mV (max)
Noise	< 5 mV peak to peak 0-300 Hz
Frequency response	Refer to frequency response section under ECG

#### Blood pressure

Gain	10 mV/mmHg $\pm 2\%$
DC offset	$\pm 20$ mV (max)
Noise	< 5 mV peak to peak 0-300 Hz
Frequency response	dc to 50 Hz-0/+2 Hz

### Wireless LAN

Operating frequency	2.4 to 2.5 GHz
Transmit power	100 mW
Data rate (802.11)	1Mbps and 2Mbps per channel; (802.11b) 1, 2, 5.5, 11 Mbps
Radio technology	Frequency-hopping spread spectrum
Communication protocol	IEEE 802.11 or IEEE 802.11b
UL 1950 Listed (ITE 9B97),	CE Mark RF Standard
US/CAN	FCC Part 15 Class B, RSS-210, Europe: ETSI EN 300 328, Japan: RCD STD-33R

### Battery

Battery type	Exchangeable Lithium-Ion
Maximum number of batteries	2
Voltage	11.1 V (nominal)
Capacity	$\geq 3.45$ Ah (varies with manufacturers)
Charge time	Less than 4 hours each
Run time	4 to 5 hours
Battery life	500 cycles to 50% capacity

### Environmental specifications

Power requirements	90-132 VAC 50/60 Hz 2.0A 190-264 VAC 50/60 Hz 1.0A
Power consumption	75 W (fully loaded)
Cooling	Convection
Heat dissipation	240 Btu/hr. (max)

Operating conditions	
Ambient temperature	0-40°C (32-104°F) (Nelcor 0-35°C (32-95°F))
While charging batteries	0-35°C (35-95°F)
CO <sub>2</sub> sensor	10-40°C (50-104°F)
Relative humidity	5-95% @40°C
Vibration	MIL-STD 810E, Method 514.4, Category 1
Altitude	-273 m to 2,943 m (-896 to 9,655 ft.)

Storage conditions	
Do not exceed	
Maximum	70°C (158°F) at 95% relative humidity
Minimum	-40°C (-40°F)
CO <sub>2</sub> sensor	-30 to 65°C (-22 to 149°F)
Batteries	-20 to 60°C (-4 to 140°F)

Physical specifications				
	Height	Depth	Width	Weight*
Dash 5000	28.7 cm (11.3 in.)	23.9 cm (9.4 in.)	30.7 cm (12.2 in.)	6.4 kg (14 lbs.)
Dash 4000	27.4 cm (10.8 in.)	24.3 cm (9.6 in.)	29.3 cm (11.5 in.)	5.5 kg (12.2 lbs.)
Dash 3000	26 cm (10.25 in.)	20 cm (8 in.)	28 cm (11.0 in.)	5.2 kg (11.2 lbs.)

\* Weight of product without batteries.

## Certification

UL2601-1 classified IEC 60601-1 certified  
 CE Marking for the 93/42/EEC Medical Device Directive UL Classified for CAN/CSA C22.2 No. 601.1

## Warranty

Standard warranty is one year.

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