

# Infinity<sup>®</sup> Delta and Delta XL Patient Monitors

With the Delta series, you can monitor the vital signs of adult, pediatric and neonatal patients with various acuity levels. Patented Pick and Go<sup>®</sup> technology enables the same monitor to stay with the patient at the bedside, on transport and in between – providing continuous monitoring and data collection.



## FEATURES

- Eliminates the need for separate transport monitors
- Works as a standalone device or connects to Infinity Network via Infinity Docking Station, DirectNet or wireless adapter for seamless wired to wireless networking
- Scales using Infinity pods and software options

### Monitoring Capabilities

Neonatal, pediatric and adult applications

## TECHNICAL DATA

### SUPPORTED PARAMETERS

#### ECG

Displays up to 12 leads

Available leads

I, II, III, aVR, aVF, aVL, V, V+, V1 – V6 [V, aVR aVF, aVL only with 5- and 6-lead sets, V+ only with 6-lead set, V1 to V6 only with 12-lead pod (12-lead not intended for neonates)], TruST<sup>®</sup> 12-lead with reduced lead-set (6-wire): I, II, III, aVL, aVR, aVF, dV1, V2, dV3, dV4, V5 and dV6 (indicated for adults and pediatrics).<sup>1</sup>

Measuring range  
(heart rate)

15 to 300 bpm

Accuracy

± 2 bpm or ± 1% (whichever is greater)

Frequency ranges

Filter off: 0.05 to 40 Hz display; 0.05 to 125 Hz printer

Monitoring filter: 0.5 to 40 Hz; ESU filter: 0.5 to 16 Hz



MT-8860-2006



MT-8848-2006

### Infinity Delta and Delta XL

Scalable patient monitors that double as transport monitors.

<sup>1</sup> Optimum performance of TruST leads is based on a minimum 0.3mV amplitude and QRS duration <180 milliseconds on patients with a body surface area (BSA) of 1.5 – 2.5 m<sup>2</sup>. TruST 12-lead reduced lead-set ECG algorithm provides 12-lead monitoring using a standard 6-wire lead-set and standard lead placement for limb leads, V2 and V5. ARIES software option enhances TruST 12-lead monitoring with the addition of 12-lead ST Analysis.

**CONTINUING TECHNICAL DATA****QRS Detection Range**

Amplitude	0.5 to 5 mV
Duration	Adult and pediatric: 70 to 120 msec Neonatal: 40 to 120 msec
Alarms	User-selectable upper and lower limits
Pacer detection (adult/pediatric)	Leads: I, II or III Amplitude: $\pm 2$ to $\pm 700$ mV Width (d.): 0.2 to 2.0 msec
Accessories	3-, 5- or 6-lead electrode set or 12-lead pod

**ST (not intended for neonates)**

Available leads	With 3-lead ST option: Choice of any 3 available leads With ARIES option: Up to 12 leads
ST complex length	892 msec (-300 to +600 msec from fiducial point)
Sample rate	225 samples/sec
Frequency response	0.05 – 40 Hz

**Isoelectric measurement point**

Measuring range	Start of ECG complex to fiducial point
Default	QRS onset – 28 msec

**ST measurement point**

Adjustment range	Fiducial point to end of ECG complex
Point default	QRS offset +80 msec
Update interval	15 sec, 1 normal beat required
Resolution	$\pm 0.1$ mm
Trends	Graphical, tabular and graphical mini-trends
INOP Alarm	Yes
Upper and lower ST alarms	$\pm 15$ mm, $\pm 0.1$ mm increments
Duration of ST event to trigger alarm	None, 15, 30, 45, 60 seconds

**Arrhythmia Detection**

Adult and Pediatric	Yes
Neonatal	No, only bradycardia is available as a low heart rate alarm in neonatal mode
ARR Mode	User Selectable; OFF, Basic or Advanced
Basic ARR (standard)	Asystole, ventricular fibrillation, ventricular tachycardia and artifact (ARR label displayed to register arrhythmia occurrence)
Advanced ARR (option)	Ventricular run, accelerated idioventricular rhythm, supra-ventricular tachycardia, couplet, bigeminy, tachycardia, bradycardia, pause and also supports PVC/min parameter output.

**Respiration**

Sensing leads	I, II (user-selectable)
Measuring method	Impedance pneumography
Auxiliary current	$\leq 10\mu\text{A}$ for any active electrode
Detection threshold	0.15 $\Omega$ to 4.0 $\Omega$ in manual mode (user adjustment) 0.2 $\Omega$ to 1.5 $\Omega$ in auto mode (automatic adjustment)
Measuring range	0 to 155 breaths per min
Accuracy	$\pm 1$ breath/min or 2% of rate (whichever is greater)
Apnea detection	For neonatal and pediatric patients
Alarms	User-selectable upper and lower respiration rate

**Pulse Oximetry (SpO<sub>2</sub>)**

SpO <sub>2</sub> Algorithm	Masimo® SET® (Signal Extration Technology) Masimo provides the industry "gold standard" for motion tolerant pulse oximetry. See additional product datasheet for more detailed specifications.
SpO <sub>2</sub> Algorithm	Nellcor™ OxiMax™ 2 See additional product datasheet for more detailed specifications.
SpO <sub>2</sub> Algorithm	Dräger's OxiSure® SpO <sub>2</sub> <sup>3</sup>

**Dräger's OxiSure® SpO<sub>2</sub>**

Connection	MultiMed pods (SpO <sub>2</sub> port) <sup>4</sup>
Displayed parameters	Saturation (fraction of oxyhemoglobin to functional hemoglobin) and pulse (rate and waveform)
Measuring method	Transmission spectrophotometry
Measuring range	SpO <sub>2</sub> : 1 to 100% Pulse: 30 to 250 bpm
Accuracy	SpO <sub>2</sub> : 0 to 69% not specified SpO <sub>2</sub> : 70 to 100%: ± 2% (± 3% for neonates; Masimo® LNOP-Ear: ± 3.5%; Nellcor® DS100A: ± 3%) Pulse: ± 3 bpm or ± 3% (whichever is greater)
Alarms	User-selectable upper and lower limits for SpO <sub>2</sub> and pulse rate Life-threatening desaturation alarm in neonatal mode only
Accessories	Dräger Medical-approved Masimo or Nellcor sensors Dräger Medical reusable SpO <sub>2</sub> sensors (not intended for neonates).

**Temperature**

Displayed parameters	Absolute and delta temperatures
Measuring range	Absolute: -5° C to 50° C Delta: 0° C to 55° C
Resolution	0.1° C
Accuracy	Absolute: ± 0.1° C Delta: ± 0.2° C
Alarms	User-selectable upper and lower limits for absolute and delta values
Accessories	Dräger Medical-approved core and skin probes

**Noninvasive Blood Pressure (NBP)**

Displayed parameters	Systolic, Mean and Diastolic pressures
Measuring method	Oscillometric utilizing step deflation
Modes of operation	Manual (single measurement); Continuous (5 minutes) and Interval
Interval times	1, 2, 2.5, 3, 5, 10, 15, 20, 25, 30, 45, 60, 120 and 240 minutes
Heart rate measuring range	30 to 240 bpm

**Pressure measuring range**

Adult	Systolic: 30 to 250 mmHg Mean: 20 to 230 mmHg Diastolic: 10 to 210 mmHg
Pediatric	Systolic: 30 to 170 mmHg Mean: 20 to 150 mmHg Diastolic: 10 to 130 mmHg
Neonatal	Systolic: 30 to 130 mmHg Mean: 20 to 110 mmHg Diastolic: 10 to 100 mmHg

**Cuff pressure**

Default inflation pressure	
Adult	160 mmHg ± 10 mmHg
Pediatric	120 mmHg ± 10 mmHg
Neonatal	110 mmHg ± 10 mmHg

## Inflation pressure after a valid measurement

Adult	(Last Systolic +25 mmHg) ± 10 mmHg
Pediatric	(Last Systolic +25 mmHg) ± 10 mmHg
Neonatal	(Last Systolic +30 mmHg) ± 5 mmHg
Maximum inflation pressure	
Adult	265 mmHg ± 5 mmHg
Pediatric	180 mmHg ± 10 mmHg
Neonatal	142 mmHg ± 10 mmHg

**CONTINUING TECHNICAL DATA**

Minimum inflation pressure	
Adult	110 mmHg $\pm$ 10 mmHg
Pediatric	90 mmHg $\pm$ 10 mmHg
Neonatal	70 mmHg $\pm$ 10 mmHg
Connector	Quick-release connector with single airway

**Invasive Blood Pressure**

Displays up to 8 pressures	
Measuring method	Resistive strain gauge transducer
Display resolution	1 mmHg
Measuring range	-50 to 400 mmHg (after zeroing)
Frequency ranges	DC to 8 Hz, DC to 16 Hz, or DC to 32 Hz (user-selectable)
Zero balance range	$\pm$ 200 mmHg
Transducer specifications	Dräger Medical-approved transducers with a resistance of 200 to 3000 $\Omega$ and an equivalent pressure sensitivity of 5 $\mu$ V/V/mmHg $\pm$ 10%
Accuracy	$\pm$ 1 mmHg or $\pm$ 3%, exclusive of transducer (whichever is greater)
IBP alarms	User-selectable upper and lower limits for systolic, mean and diastolic pressures
Accessories	Dräger Medical-approved pressure transducers

**Cardiac Output**

Parameter display	Cardiac output, Blood Temperature, Injectate Temperature
Measuring method	Thermodilution
Connection	Hemo2, Hemo4 or HemoMed pods

**Measuring range**

Cardiac output	0.5 to 20 L/min
Blood temperature	25° C to 43° C (77° F to 109° F)
Injectate temperature	-5° C to +30° C (23° F to 86° F)

**Accuracy**

Cardiac output	$\pm$ 5% (with 0° C injectate)
Injectate temperature	$\pm$ 0.25° C
Degree of protection against electric shock	Type CF
Defibrillation protection	Defibrillation-Proof Applied Part per IEC 60601-1

**DISPLAY SPECIFICATIONS**

Type	Thin Film Transistor-Liquid Crystal Display Active Matrix (TFT-LCD)
Size (Delta)	264 mm (10.4 in.) diagonal
Channels	5 standard, 6, 8 optional
Viewing area	211 x 158 mm (8.3 x 6.2 in.)
Resolution	640 x 480 pixels
Size (Delta XL)	310 mm (12.2 in.) diagonal
Channels	6 standard, 8 optional
Viewing area	246 x 184.5 mm (9.7 x 7.3 in.)
Resolution	800 x 600 pixels
Rotary knob	Easy-to-use menu structure and fixed keys

**Alarms**

Priorities	3; High (Life Threatening), Medium (Serious), Low (Advisory)
Audio Alarm Tones	User Selectable: Infinity, IEC 1 <sup>2</sup> or IEC 2 <sup>2</sup>

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**Connections**


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MultiMed® cables, Masimo SET® SmartPod®, Nellcor Oximax SmartPod<sup>2</sup>, HemoMed™ Pod, Pod Communication ports (Delta: 1 standard, 2<sup>nd</sup> optional; Delta XL: 2 standard), NBP Input, etCO<sub>2</sub> module, Infinity Docking Station, analog output, QRS sync output, RS 232, remote keypad, and Scio® Four modules.

**Analog Output**


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Signals	ECG, arterial blood pressure
Delay	≤25 msec

**Infinity Network**


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Networking Method	DirectNet, wireless or via Infinity Docking Station
Wireless Encryption	None, WEP, WPA2 <sup>2</sup>

Some connections are only accessible via the IDS connection, see individual product datasheets for detailed information.

**Physical Specifications**


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Cooling	Convection
Size (Delta) H x W x D	253 x 365 x 190 mm (10.0 x 14.4 x 7.5 in.)
Weight (Delta) with external battery	5.8 kg (12.7 lbs.) 6.4 kg (14.0 lbs.)
Size (Delta XL) H x W x D	272 x 384 x 190 mm (10.7 x 15.1 x 7.5 in.)
Weight (Delta XL) with external battery	6.2 kg (13.6 lbs.) 6.8 kg (14.9 lbs.)

**Information Management Capabilities**


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Data storage	24 hours of trended parameter information
Data resolution	30-second sampling
Trend tables	1-, 5-, 15-, 30- or 60-minute display formats
Trend graphs	1-, 2-, 4-, 8-, 12- or 24-hour display formats

**Electrical Specifications**


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Input voltage	11 to 15 V DC
Power consumption	≤70 Watts (fully loaded)
Patient leakage current	≤10 μA
Protection class	Internally powered (per IEC 60601-1) and for use with specified Class 1 power supplies.
Power requirements	100 to 240 V AC, 3 A
Frequency	50 to 60 Hz
Chassis leakage current	<300 μA @ 120 V AC <500 μA @ 220 V AC

**BATTERY SPECIFICATIONS**


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Internal battery	Battery type: lithium-ion Battery capacity: 180 minutes
Charging time	6.5 hours at 25° C
External auxiliary battery	Battery type: sealed lead-acid Battery capacity: 50 minutes Charging time: 3.5 hours at 25° C
Size (external auxiliary battery) H X W X D	62 x 182 x 24 mm (2.4 x 7.2 x .9 in.)
Weight	0.635 kg (1.4 lbs.)

Battery capacity varies with parameter configuration. The battery capacity specified above is under the following load conditions: MultiMed with SpO<sub>2</sub> sensor<sup>4</sup>, 2 temperature probes, HemoMed pod with 4 IBP transducers and a catheter, NBP taking measurements every 15 minutes, LCD Transport Brightness at 50%, and no continuous tone being generated.

Battery capacity may diminish after extended use.

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## CONTINUING TECHNICAL DATA

### Environmental Requirements

#### Temperature range

Operating	10° C to 40° C (50° F to 104° F)
Storage	-20° C to 40° C (-4° F to 104° F)

#### Relative humidity

Operating	20% to 90%, non-condensing
Storage	10% to 95% (with packaging)

#### Atmospheric pressure

Operating	525 to 795 mmHg (70 to 106 kPa)
Storage	375 to 795 mmHg (50 to 106 kPa)

### Standards

IEC 60601-1(2<sup>nd</sup> edition) and applicable particular and collateral standards,

IEC 60601-1-2:2007, Electromagnetic compatibility CISPR 11, Class B

The Delta and Delta XL monitors comply with Medical Devices Directive (MDD) 93/42 EEC and bear the CE mark.

## ORDERING INFORMATION

Delta Monitor	MS18597
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Delta XL Monitor	MS18596
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Note: Infinity Docking Station/monitor power supply, MultiMed, and all patient connection and intermediate cables must be ordered separately.

### Power Cables

Europe, CEE 7, 2.5 m	4321712
North America, 5-15R, 2.25 m	4321720
Switzerland, SEV 1 01 1, 2.25 m	4321613
Great Britain, BS 1363, 3 m	1851713
Australia, New Zealand, AS3112, 3 m	1851705
China, AS 3112, 3 m	1859714
Denmark, 3 m	1851721

### Docking Stations

Infinity Docking Station (IDS)	5206110
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Provides mechanical mounting as well as interfaces for monitor's electrical, network, video, recorder, and RS 232 data export and serial communications.

Mounting Docking Station	4715319
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For use in standalone configurations

Infinity Docking Station with integrated MIB	7489375
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Infinity Docking Station/Monitor Power Supply

MS18284
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Note: Powers monitor directly or via Infinity Docking Station

Docking Station Interface and Power	5732388
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Monitor Handle Hook Mount	MS15202
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### MultiMed Pods and Cables

Multi-parameter cables to monitor

ECG (3, 5 or 6 lead-wires), impedance respiration, SpO<sub>2</sub>\* and one temperature (two temperatures with Y-cable)

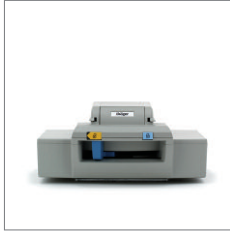
MultiMed Plus, 2.5 m	MS20093
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MultiMed Plus OR, 2.5 m	MS20094
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Includes integrated ESU filter for operating room environments.

MultiMed 5, 2.5 m	3368391
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MultiMed 6, 2.5 m	5191221
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MT-1815-2006

Infinity Docking Station



MT-1126-2007

MultiMed Pod



MT-2185-2003

HemoMed Pod



MT-9018-2006

Recorder

## CONTINUING ORDERING INFORMATION

NeoMed, 2.5 m	5590539
ECG (3 lead-wires), impedance respiration, two temperatures, SpO <sub>2</sub> * and FiO <sub>2</sub> .	
MultiMed or NeoMed Pole/Rail Mount	MP00721
MultiMed 12 Pod <sup>5</sup>	5589663
For diagnostic 12-lead ECG and SpO <sub>2</sub> * <sup>4</sup>	

\*SpO<sub>2</sub> measurements are not available from the MultiMed pods and cables if you are using an alternate source of SpO<sub>2</sub>

### SpO<sub>2</sub> Pods

Masimo SET SpO <sub>2</sub> SmartPod <sup>5</sup>	MS16901
Nellcor OxiMax SpO <sub>2</sub> SmartPod <sup>2, 5</sup>	MS23997

### Software Options

Available with Delta only	
6 waveform channel option	5597914
2nd Pod Comm port option	5597203

### Delta and Delta XL

6 - 8 waveform channel option	5597922
Physiological Calculations option <sup>5</sup>	5201996
Arrhythmia II option (ACE)	4322967
Wireless option**	7498087
3-lead ST Analysis Option (not required with 12-lead option)	5201988
ARIES 12-lead ST analysis option	5597328
ARIES/Physiological Calcs/Arrhythmia package	5443910

OR mode option (stored in the monitor)	MS17653
OR mode IDS option (stored in the IDS)	MS17034

\*\*Wireless LAN PC card (MS25009<sup>2</sup>), and access point installation is required for wireless monitoring.

### Optional Modules and Hardware Accessories

Invasive Blood Pressure Adapters	
2 IBP Y-adapter, 10-pin	5731281
2 IBP Y-adapter, 7-pin	5592147

### Hemodynamic Pods

HemoMed Pod <sup>5</sup>	5588822
Provides management of up to 4 invasive blood pressures and cardiac output.	
Hemo2 <sup>®</sup> Pod <sup>5</sup>	4319435
Provides management of up to 2 invasive blood pressures, cardiac output and 1 additional temperature.	
Hemo4 <sup>®</sup> Pod <sup>5</sup>	4315961
Provides management of up to 4 invasive blood pressures, cardiac output and 1 additional temperature.	

### PiCCO<sup>®</sup> SmartPod Kit

PiCCO SmartPod Kit <sup>5</sup>	MS16734
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PiCCO technology uses quantitative parameters that are determined both intermittently through PULSION's transpulmonary thermodilution technique and continuously through arterial pulse contour analysis.

Provides management of up to 4 invasive blood pressures.

PULSIONCATH arterial thermodilution catheters can be procured from Pulsion directly.

### etCO<sub>2</sub>, Transcutaneous O<sub>2</sub>/CO<sub>2</sub> Gas Monitoring

etCO <sub>2</sub> module (Mainstream/Sidestream) <sup>5</sup>	4319310
etCO <sub>2</sub> pod (Mainstream/Sidestream) <sup>5</sup>	5740738
etCO <sub>2</sub> Microstream <sup>®</sup> pod <sup>5</sup>	7870947
etCO <sub>2</sub> + Respiratory Mechanics pod <sup>5</sup>	5740704

**CONTINUING ORDERING INFORMATION**

tcpO <sub>2</sub> /CO <sub>2</sub> pod <sup>5</sup>	5592535
Scio Four Modules <sup>5</sup>	6871810
Scio Four Oxi plus, Scio Four plus, Scio Four Oxi and Scio Four modules	

**Neurological Monitoring**

EEG Pod <sup>5</sup>	5736744
Trident <sup>®</sup> (NMT) SmartPod <sup>5</sup>	MS15007
BISx <sup>™</sup> SmartPod <sup>5</sup>	MS14796

**Printing/Recording Options**

R50 recorder <sup>5</sup>	5952630
R50N network recorder <sup>5</sup>	5740068
Infinity Network laser printer (115 V)	6556513
Infinity Network laser printer (220 V)	6556539

**Other Accessories**

Remote keypad	5203042
External battery (sealed lead acid)	5592097
External battery charging station (charges four batteries simultaneously)	5597377

<sup>2</sup> Requires VF8 software.

<sup>3</sup> Certain markets do not offer this algorithm.

<sup>4</sup> Only available with Dräger's OxiSure algorithm.

<sup>5</sup> Refer to individual module or pod datasheet for additional information.

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