Dräger

Infinity® 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® technology enables the same monitor to stay with the patient at the bedside and on transport – providing continuous monitoring and data collection.

MT-2226-2003

FEATURES

– Doubles as a transport monitor, eliminating 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

MT-8850-2006

Infinity Delta

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® 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).[1]
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-8848-2006

Infinity Delta XL

[1] 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 m². 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: ± 2 to ± 700 mV
	Width (d_P): 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	± 0.1 mm
Trends	Graphical, tabular and graphical mini-trends
INOP alarm	Yes
Upper and lower ST alarms	± 15 mm, ± 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	≤ 10µA for any active electrode
Detection threshold	0.15Ω to 4.0Ω in manual mode (user adjustment)
	0.2Ω to 1.5Ω in auto mode (automatic adjustment)
Measuring range	0 to 155 breaths per min
Accuracy	± 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$_2$)

SpO$_2$ algorithm	Masimo® SET® (Signal Extraction Technology)
	Masimo provides the industry "gold standard" for motion tolerant pulse oximetry technology as documented in Masimo's peer reviewed studies (www.masimo.com).
	See the Infinity Masimo SET SmartPod datasheet for more detailed specifications.

SpO$_2$ algorithm	Nellcor™ OxiMax™[2]
	See The Infinity Nellcor OxiiMax SmartPod datasheet for more detailed specifications.
SpO$_2$ algorithm	Dräger's OxiSure® SpO$_2$

Dräger's OxiSure SpO$_2$

Connection	MultiMed® pods (SpO$_2$ port)[4]
Displayed parameters	Saturation (fraction of oxyhemoglobin to functional hemoglobin) and pulse (rate and waveform)
Measuring method	Transmission spectrophotometry
Measuring range	SpO$_2$: 1 to 100%
	Pulse: 30 to 250 bpm
Accuracy	SpO$_2$: 0 to 69% not specified
	SpO$_2$: 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$_2$ and pulse rate
	Life-threatening desaturation alarm in neonatal mode only
Accessories	Dräger approved Masimo or Nellcor sensors
	Dräger reusable SpO$_2$ 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 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

CONTINUING TECHNICAL DATA

Maximum inflation pressure	
Adult	265 mmHg ± 5 mmHg
Pediatric	180 mmHg ± 10 mmHg
Neonatal	142 mmHg ± 10 mmHg
Minimum inflation pressure	
Adult	110 mmHg ± 10 mmHg
Pediatric	90 mmHg ± 10 mmHg
Neonatal	70 mmHg ± 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	± 200 mmHg
Transducer specifications	Dräger approved transducers with a resistance of 200 to 3000Ω and an equivalent pressure sensitivity of 5µV/V/mmHg ± 10%
Accuracy	± 1 mmHg or ± 3%, exclusive of transducer (whichever is greater)
IBP alarms	User-selectable upper and lower limits for systolic, mean and diastolic pressures
Accessories	Dräger approved pressure transducers

Cardiac Output	
Parameter display	Cardiac output, blood temperature, injectate temperature
Measuring method	Thermodilution
Connection	QuadHemo 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	± 5% (with 0° C injectate)
Injectate temperature	± 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[2] or IEC 2[2]

Connections

MultiMed cables, Masimo SET SmartPod®, Nellcor OxiMax SmartPod[2], HemoMed pod, pod communication ports (Delta: 1 standard, 2nd optional; Delta XL: 2 standard), NBP Input, etCO$_2$ module, Infinity Docking Station, analog output, QRS sync output, RS 232, remote keypad, and Scio® Four modules.

Analog Output

Signals	ECG, arterial blood pressure
Delay	≤25 msec

Infinity Network

Networking method	Wired via DirectNet or Docking Station
	Wireless via WLAN PC card
Wireless encyption	None, WEP, WPA2[2]

Provides access to the Infinity Central Station, R50N bedside network recorder, laser printer, nurse call system and remote view.

Physical Specifications

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)	5.8 kg (12.7 lbs.)
with external battery	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)	6.2 kg (13.6 lbs.)
with external battery	6.8 kg (14.9 lbs.)

Information Management Capabilities

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

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

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)	62 x 182 x 24 mm
H x W x D	(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$_2$ sensor[4], 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.

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 and applicable particular and collateral standards,
IEC 60601-1-2, 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
Delta XL Monitor	MS18596

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	1851691
Great Britain, BS 1363, 3 m	1851713
Australia, New Zealand, AS3111, c13, 3 m	1851705
China, GB1001, 3 m	1859714
Denmark, RoHS, 3 m	1868950
Brazil, NBR14136, RoHS, 3m	1875523

Docking Stations

Infinity Docking Station (IDS) Provides mechanical mounting as well as interfaces for monitor's electrical, network, video, recorder, and RS 232 data export and serial communications.	5206110
Infinity Docking Station with Integrated MIB Provides mechanical mounting as well as interfaces for monitor's electrical, network, video, recorder, RS 232 data export and serial communications, and device connectivity via MIB.	7489375
Infinity Docking Station + Monitor Power Supply	7265130
Interface Docking Station Provides mechanical mounting as well as interfaces for monitor's electrical, video, recorder, and RS 232 data export and serial communications	5732388
Mounting Docking Station Provides mechanical mounting only	4715319
Monitor Handle Hook Mount	MS15202

MultiMed Pods and Cables

Multi-parameter Cables to Monitor
ECG (3, 5 or 6 lead-wires), impedance respiration, SpO$_2$* and one temperature
(two temperatures with Y-cable, four temperatures with HemoPod.)

MultiMed Plus, 2.5 m	MS20093
MultiMed Plus OR, 2.5 m	MS20094

Includes integrated ESU filter for operating room environment.

Infinity Docking Station

MultiMed Pod

HemoMed Pod

Recorder

CONTINUING ORDERING INFORMATION

MultiMed 5, 2.5 m	3368391
MultiMed 6, 2.5 m	5191221
NeoMed, 2.5 m	5590539
ECG (3 lead-wires), impedance respiration, two temperatures, SpO_2* and FiO_2.	
MultiMed or NeoMed Pole/Rail Mount	MP00721
MultiMed 12 Pod[5]	5589663
For diagnostic12-lead ECG and SpO_2*[4]	

*SpO_2 measurements are not available from the MultiMed pods and cables if you are using an alternate source of SpO_2

SpO_2 Pod Kits

Masimo SET SpO_2 SmartPod[5]	MS16901
Nellcor OxiMax SpO_2 SmartPod[2, 5]	MS25020

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[5]	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	5943910
OR Mode Option (stored in the monitor)	MS17653
OR Mode IDS Option (stored in the IDS)	MS17034

**Wireless LAN PC Card (MS25009[2]), 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[5]	5588822
Provides management of up to 4 invasive blood pressures and cardiac output.	
QuadHemo Pod[5]	4315961
Provides management of up to 4 invasive blood pressures, cardiac output and two temperatures.	

PiCCO® SmartPod Kit

PiCCO SmartPod Kit[3,5]	MS16734

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.
PULSIOCATH arterial thermodilution catheters can be procured from Pulsion directly.

$etCO_2$, Transcutaneous O_2/CO_2 Gas Monitoring

$etCO_2$ Module (Mainstream/Sidestream)[5]	4319310
$etCO_2$ Pod (Mainstream/Sidestream)[5]	5740738
$etCO_2$ Microstream® Pod[5]	7870947
$etCO_2$ + Respiratory Mechanics Pod[5]	5740704
$tcpO_2$/CO_2 Pod[5]	5592535
Scio Four Modules[5]	6871810
Scio Four Oxi Plus, Scio Four Plus, Scio Four Oxi and Scio Four Modules	

CONTINUING ORDERING INFORMATION

Neurological Monitoring

EEG Pod[5]	5736744
Trident® (NMT) SmartPod[3,5]	MS15007
BISx® SmartPod[5]	MS14796

Printing/Recording Options

R50 Recorder[5]	5952630
R50N Network Recorder[5]	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
MIB II Protocol Converter Protocol converter box to interface a third party device to Infinity monitors using an Infinity Docking Station or Infinity Kappa monitor equipped with a MIB II 1-4 option.	7256931

[2] Requires VF8 software.
[3] Requires VF8.1 software.
[4] Only available with Dräger's OxiSure algorithm.
[5] Refer to individual module or pod datasheet for additional information.

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The quality management system at Draeger Medical Systems, Inc. is certified according to ISO 13485, ISO 9001 and Annex II.3 of Directive 93/42/EEC (Medical devices).