D-MAS HyperSat

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Product Description and Specification

Dan Medical
Connecting Health®

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D-MAS HyperSat

D-MAS HyperSat is the medical monitoring solution for Saturation Diving and Hyperbaric Chambers.

Deploying HyperSat delivers a step-change in medical safety for divers in saturation and for patients in Hyperbaric chambers.

Benefits

- Records, displays and transmits patient physiological data in real time - from within the chamber
- Enables the Dive Medic to share an unprecedented level of medical data with shore-based Medical Doctors and specialists.
- Significantly improves management of healthcare emergencies, by providing expert real-time medical support to the patient in the chamber.
- Enables in-chamber monitoring on a pro-active basis, as part of a Fitness-to-Work or Occupational Health programme.

D-MAS HyperSat provides a full range of medical monitoring from within the chamber to enable remote diagnosis and healthcare support.

Use of the HyperSat allows effective clinical interpretation and support from outside the chamber – including from doctors onshore, or at a base location.

From within the chamber, D-MAS HyperSat measures the patient's clinical vital signs; heart rhythm, blood pressure, SpO2 and core temperature.

Additional medical functions are available: Digital Imaging for wound care or trauma, skin examination or dematology, and a patient monitor camera.

For Divers, the medical data is transmitted from inside the chamber to a specialist doctor onshore, enabling expert medical advice to the divers in real-time. This supports compliance with OGP 411 (Medical equipment within the chamber) and DMAC 28 (Patient Monitoring system). These standards are now adopted by the world's leading energy companies.

For Patients in Hyperbaric chambers, medical data from the patient in the chamber is shared with medical staff outside the chamber for real-time monitoring.

Medical Functions

Standard functions:

- Blood Pressure
- Resting ECG 12-channel
- Extended ECG
- Pulse Co-Oximetry (SpO2) using Masimo SET technology
- Core Temperature
- Digital Imaging

Communications

Wireless communications enable live images and monitoring to any online location in the world, giving unprecedented levels of health surveillance and support to medics and divers.

Optional functions

Optional functions include modules for Spirometry (right)and the Remote Medic Consult Database, and Specialist Digital Image capture with:

- Laryngoscope (Throat) right, lower
- OtoScope (Ear)
- IrisScope (Eye)
- Dermatoscope (Skin)
- DentalScope (Mouth and Teeth) below:

Compliance and Testing

D-MAS HyperSat is intrinsically safe for use in pressurised environments.

Pressure tested in Heliox to 450msw pressure (45 bar).

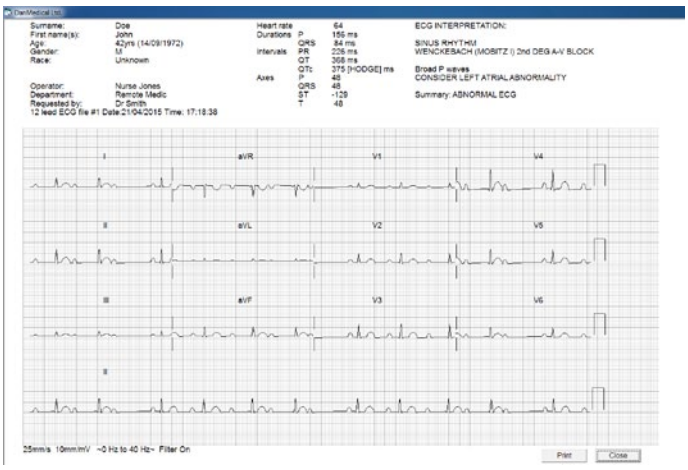
Tested in elevated oxygen to 18msw, (25% oxygen:air mixture).

Testing verified by DNV.

Sharing and using the data

The system is intuitive to use, as it uses a familiar Windows interface. The data is transmitted in a format to suit the client or doctor's requirements – including live monitoring screen, encrypted patient data, streamed data, in each case using a standard internet connection.

These enable the client to record the communications and medical data in their preferred system and format, integrating with their existing infrastructure and electronic patient record system.



Medical Specification

Patient population: The D-MAS is designed for use with adult patients.

Non-Invasive Blood Pressure (NIBP)

Supplied with adult cuffs in three sizes	(S,M,L)
Cuff pressure measurement range	0 to 300 mmHg
Cuff target pressure	100 to 275 mmHg
Cuff overpressure maximum	280 to 300 mmHg

NIBP limits of accuracy

Parameter	Max	Min
Systolic	275 mmHg	60 mmHg
Diastolic	150 mmHg	30 mmHg
MAP	166 mmHg	40 mmHg
Pulse rate	175 bpm	40 bpm
Determination time	165s	35 to 55s typical

ECG

12 channel ECG	Multi-channel (I, II, III, aVR, aVL, aVf, V1-V6)
Frequency response	75Hz, -3dB(IEC); 100Hz, -3dB(AHA)
Input impedance	>5M
Common mode rejection	>96dB
Signal bandwidth	(-3dB) 0.05-250Hz
Resolution	3.75uV
Gain accuracy	2.5% per lead
DC dynamic span	±300 mV (95% gain accuracy)
AC dynamic span	±5mV
Recovery time after defibrillation	5s 80% gain accuracy
Degree of protection against electrical shock	CF

ECG limits of accuracy

Parameter	Max	Min
Heart rate	240 bpm	30 bpm
QRS amplitude	2 mV	0.5 mV

Pulse Co-Oximetry with Masimo SET finger clip sensor for SPO2 (Saturated Oxygen)

Oxygen Saturation (%SpO2)	0 -100%
Pulse Rate	25 - 240 (bpm)
Perfusion Index	0.02% - 20%
Carboxyhemoglobin Saturation (optional extra)	(%SpCO): 0 - 99%
Methemoglobin Saturation (optional extra)	(%SpMet): 0 - 99.9%
Pleth Variability Index (optional extra)	0 - 99%

Technical Specification

Physical Characteristics

Overall Dimensions	376 x 270 x 105 mm
Battery blades	Each 350 x 120 x 20 mm (included in overall dimensions above)
Weight	HyperSat device: 4.7 kg, HyperSat device with two battery blades: 7.2kg
Screen	15.6”matt (396mm) non-glare screen
EMC Compliance	EN60601-1-2, Class B
Equipment Classification	IEC 60601-1 / UL 60601-1
Type of Protection	Class I
Degree of Protection	Patient Cable Type CF-Applied Part
Mode of Operation	Continuous

Performance specifications

Pressure

Maximum operational environmental pressure	450msw (45 bar)
Hyperbaric chambers	18msw 25% O2 air
Saturation Diving chambers	450msw 98% Helium 2% O2

Environmental

Operational temperature	0 to 50°C
Operational humidity	0 to 95%NC
Storage temperature	-5 to 60°C
Storage humidity	0 to 95%NC

Compliance

Complies with EC Directive 93/42/EEC on Medical Devices, Annex V.

D-MAS carries the “CE” mark having been assessed and certified as a Combined Patient Monitoring system.

Power source

External AC power used either for supply of 19 V DC through a penetrator, or for external recharge of the portable battery blades supplied with the HyperSat.

AC Power requirements (outside chamber)	100 – 240vAC, 2.5A, 50-60 Hz
Input Voltage Range	16-19 V DC
Input current	3A
Battery blades	(Ni-Mh AA Cell Dual Battery Blades)
Capacity	10AH each, with “hotswap” facility for continuous monitoring. D-MAS is IP00 rated.

Computing Specification

CPU	i7 2720QM 2.2GHz
HDD	SSD 250GB
RAM	8G RAM
NVIDIA Graphics	GeForce GTX670M

D-MAS HyperSat medical monitoring system comprises a completely integrated medical monitoring and diagnostic device;

- Microsoft Windows Operating system
- Pre-installed with D-MAS medical software suite 2015

Information

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Please note: Specification is correct at time of publication, but is subject to change as a result of continuing development programme.