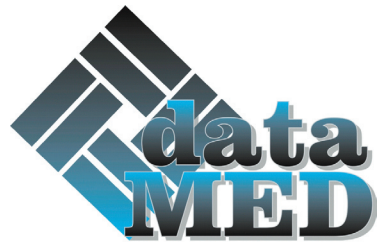


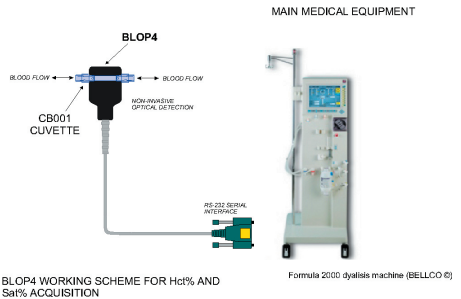
BLOP4



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BLOP4 measuring head



BLOP4 WORKING SCHEME FOR Hct% AND Sat% ACQUISITION

BLOP4 system setup

BLOP4 Hematocrit and blood Saturation Optical Detector

This probe can detect the blood Saturation and Hematocrit with noninvasive optical method using a disposable plastic cell. It performs the detection by means a ratiometric measurement at multi-wavelengths.

Optical information is digitalized with 12 bit resolution through an internal microprocessor and transmitted to a host PC via RS-232. A PC software program under Windows 98/2000/XP® operating system displays, stores and processes the acquired data using a powerful database.

BLOP4 can be easily connected and interfaced to every equipment having a RS-232 serial interface.

The future of innovation...

BLOP4 is a totally integrated device for monitoring of blood Hematocrit (corpuscular percentage of the whole blood volume) and blood Saturation (percentage of oxyhemoglobin fraction over total hemoglobin).

BLOP4 can be used in every treatment requiring an extra-corporeal blood circulation, mainly for all therapies dealing with vital functions (*ECLS, Extra-Corporeal Life Support*).

Typical fields of application are the following:

- Cardiac Surgery (*monitoring of heart-lung machine performance*)
- Treatment of ESRD (*End Stage Renal Failure treatment by continuous monitoring of blood volume changes and blood oxygenation*)
- Loco regional pharmacological therapies for tumours treatment (*blood oxygenation monitoring*)
- Respiratory assistance ARDS/ECMO (*Acute Respiratory Distress Syndrome and Extra Corporeal Membrane Oxygenation therapies requiring blood oxygenation monitoring*)
- Organs preservation (*blood oxygenation and hematocrit monitoring*)
- Blood detoxification extracorporeal
- Plasma Apheresis and Blood donation (*hematocrit monitoring*)
- Bioartificial liver

BLOP4 Features

Specification (1)	Value
Hematocrit Range	15-50%
Hematocrit Resolution	1 %
Hematocrit Accuracy (2)	+/- 5%
Saturation Range	40-100%
Saturation Resolution	0.1 %
Saturation Accuracy (3)	+/- 5 %
Blood Flow (with CB001 cuvette)	0.2-0.8 l/min
Data rate	5 sec.
Power consumption	60 mA @ 5V
Blood operating temperature	32°C - 37°C
Ambient operating temperature	5°C - 45°C
Storage temperature	-20°C/+60°C
Storage Humidity	5% - 90%

(1) all specification are applicable when BLOP4 is used in conjunction with CB001 disposable cuvette
 (2) see technical bulletin on Datamed web site (<http://www.datamedsrl.com>)
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BLOP4 uses a disposable plastic cuvette (**CB001**) made on medical grade hemocompatible plastic polymer.

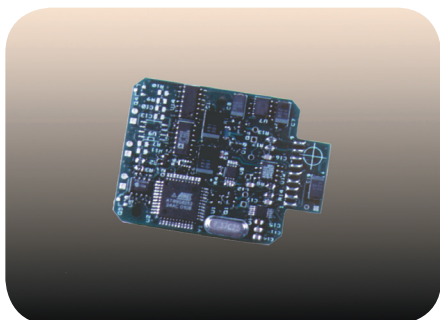
CB001 disposable cell is snapped into the **BLOP4** measuring head and connected to a PVC tube set (4.3 x 6.8 mm) for blood circulation. Different diameter are available.



CB001 Plastic disposable cuvette

BLOP4 is state-of-the-art optoelectronic device for non-invasive optical blood Haematocrit and Saturation detection.

BLOP4 is made on high technology and high integration SMT electronic with very low noise high gain analog amplifiers. An internal microprocessor controls the analog-to-digital 12 bit acquisition, the calculation algorithms and RS-232 data transfer protocol.



BLOP4 Internal SMT electronic board

Here below is reported the **BLOP4** 9 pin male connector pinout.
For female connector please contact DATAMED S.r.L.

PIN	FUNCTION	Direction	
		IN	OUT
1	DIGITAL SIGNAL		X
2	PROBE RS232 TRANSMITTER		X
3	PROBE RS232 RECEIVER	X	
4	DIGITAL SIGNAL	X	
5	GND	--	--
6	DIGITAL SIGNAL	X	
7	VCC	--	--
8	GND	--	--
9	DIGITAL SIGNAL	X	

Male 9 pin D-Sub connector

NOTE: All the digital signals I/O are used only to download the program code (firmware) into the probe during factory assembling.
It would be important to leave these pins open (in particular pins 1, 9). Also the others pins (4, 6) should be left floating (if this is not possible please connect them to ground level).

BLOP4 DATA TRANSFER PROTOCOL AND SERIAL INTERFACE

baud rate: 9600 baud
n° of bit: 8 (1 start bit, 1 stop bit)
parity: none
level signals: positive and negative in according to EIA232 standard specifications
handshake: no handshake (only TX and RX signal are used)
protocol: transmitted data are in ASCII code (4 bytes/parameter) with 4 fixed synchronization bytes (9, 13, 90, 130 ASCII code)

At the beginning of the sequence the **BLOP4** starts to send data packet after a 117 ASCII code is received from host CPU; if a 117 is not received the data interface remains in stand by. The data packet is refreshed every 5 sec., so the maximum polling rate is 5 seconds. Here below the data sequence is shown:

From host CPU to **BLOP4**:

a. 117 (ASCII)

From **BLOP4** to host CPU:

b. 9 - 13 - 90 - 130 - Sat% (4 bytes) - Hct% (4 bytes) - Error byte (1 byte) - Checksum (1 byte)

Synchronization Sequence

Measured Parameters

Status Bytes

BLOP4 STATUS AND ERROR CODES

- 0** = probe connected and operating; cuvette inserted; blood flowing (normal condition)
- 1** = probe connected and operating; no cuvette is inserted in the probe slot
- 255** = probe damaged; Sat% and Hct% measurements not reliable; please contact Datamed S.r.l. for technical assistance.

BLOP4 probe works with a single 5V voltage supply (+/-5%). Average current absorption is 60 mA. Inrush current during start up can be higher due to internal capacitor to charge.

SCIENTIFIC REFERENCES

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- *"Optical transmission and reflection by blood"* R. J. Zdrojowski, N. R. Pisharoty, IEEE Transactions on Biomedical Engineering Vol. BME-17, n° 2 April 1970

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