BUBBLE COUNTER FLOW

bcf.300

THE NEW GENERATION OF MICROBUBBLE ANALYSIS

gaMPT
ULTRASONIC SOLUTIONS

GAMPT - YOUR PARTNER IN AIR BUBBLE ANALYSIS

Since 1996 the team of GAMPT develops and produces high-quality measuring technology for the detection and analysis of microbubbles during extracorporeal circulation (ECC).

The BubbleCounter is an established tool in many leading cardiac centers worldwide (e.g. Heart Center Coswig, GOSH London, Rigshospital Copenhagen, MAYO Clinic Rochester, King Faisal Hospital Riyadh) and at manufacturers of heart-lung machines and ECC components (e.g. Medtronic, Terumo, LivaNova, Eurosets, Fresenius).

With the BCF300 we proudly present our newest innovative model with the latest electronics and patented [1)] sensor technology.

1) Patent granted. Number: 10 2015 120 099

gaMPT ULTRASONIC SOLUTIONS

AIR BUBBLES
A CLINICAL PROBLEM

The application of extracorporeal circulation during heart surgical interventions is often associated with a considerable neurophysiologic risk [Roach, G.W. 1996] [1)], [Walzer, T. 1997] [2)] .

Microbubbles play a decisive role in the ECC. It could be shown that transcranially detected microembolism in the medial cerebral artery is closely connected to microbubble concentration in the ECC and such may be jointly responsible for post-operative neurophysiologic deficiencies [Borger, M.A. 2001] [3)].

1) Roach, G.W. et.al. (1996): Adverse cerebral outcomes after coronary bypass surgery: N. Engl. J. Med., 335(25), 1857-1863.
2) Walzer T. et.al. (1997): Neuropsychological disorders after coronary bypass surgery: J. Neurol. Neurosurg. Psychiatry, vol.62, 6, 644-648.
3) Borger M.A. et.al. (2001): Neuropsychologic impairment after coronary bypass surgery: Effect of gaseous microemboly during perfusionist interventions: J. Thorac. Cardiovasc. Surg., vol.121, 4, 743-749.

BCF300 - THE GOLD STANDARD FOR AIR BUBBLE ANALYSIS DURING ECC

The BCF300 is a precise measuring system for the non-invasive monitoring and documentation of microbubble activity during extracorporeal circulation. Using latest Doppler ultrasound measuring technique the accurate analysis of the microbubble size distribution in the blood of the ECC is possible.

Its outstanding measurement accuracy in determining the size, number and volume of microbubbles as well as the measured volume flow rate can be used to improve the quality of the individual components of the HLM.

gaMPT ULTRASONIC SOLUTIONS

USE OF THE BCF300 IN PRACTICE

For the monitoring of microbubble activity during the ECC the probes can be placed at different positions of the tubing system depending on the topic to investigate.
This leads to a wide range of applications for the BubbleCounter BCF300:

- monitoring and documentation of microbubbles and volume flow rate throughout the course of the operation
- training and optimizing of the handling during the operation because of real-time display of the bubble activity [Herbst, P.D. 2016] [1)]
- targeted setup adjustment to the respective perfusion requirements
- efficiency analysis of individual HLM components (oxygenator, filter) by comparing the bubble distribution between input and output [Stehouwer, M.C. 2016] [2)]
- use with all kinds of ECC (HLM, ECMO) [Born, F. 2017] [3)] [Wagner, S. 2015] [4)]

1) Herbst, Daniel P. (2016): Effects of Purge-Flow Rate on Microbubble Capture in Radial Artial-Line Filters: J. ExtraCorpor Technol, 48(3):105-112, PMID: 27729703.
2) Stehouwer, Marco C. (2016): Effect of Oxygenator Size on Air Removel Characteristics: A clincal Evaluation: ASAIO, 62(4):421-6 PMID: 26919180.
3) Born, F., Chen, J., Thierfelder, N., Günther, S., Peterß, S., Hagl, C., König, F. (2017): Microbubble activity during extra corporeal life support: DGTHG scientific program, 91.
4) Wagner, Stephan et.al. (2015): Observation of microbubbles during standard dialysis treatments: Clinical Kidney Journal, Vol. 8, No. 4, 400-404 PMID: 26251706.

USER INTERFACE

Creating the user-interface we reverted to the long term experiences and the feedback of the perfusionists. Thus, the BCF300 has a clearly structured user-interface that enables intuitive handling and inscriptions conforming to standards. The current bubble activity and the time course can be quickly obtained. The color coded measuring channels enable an easy localization of the probe position in the blood circulation. The bubble distribution, the bubble volume and the flow rate are displayed and evaluated simultaneously for up to three measuring points in the ECC.

CONTINUOUS MONITORING

- real-time display of the current bubble activity in number and size
- display of all measured bubbles in histograms
- numeric display of the cumulated bubble activity
- registration of administrative data and status information
- display of volume flow rate (with flow probe)

MEASUREMENT OVERVIEW

- time course of bubble number and volume as well as volume flow rate (with flow probe)
- time course of bubble size distribution
- switchable display of the various parameters
- documentation of inserted comments

gaMPT ULTRASONIC SOLUTIONS

CONTROL OF THE MEASUREMENT PROCESS

- intuitive handling of the touch elements to control the measurement
- switching between the displayed parameters
- set of predefined comments during the measurement
- generation of screenshots for documentation and evaluation
- acoustic signaling of the bubble activity

SOFTWARE BCF300

Feedback of our customers and our own experience were incorporated in the software. The result is a program easy and clear in structure and intuitively to handle.

OFFLINE EVALUATION

- evaluation of stored measurements directly on the device
- zoom and ROI with calculation of the bubbles and their distribution for selected time frames
- screenshots as well as PDF and Excel export of selected areas

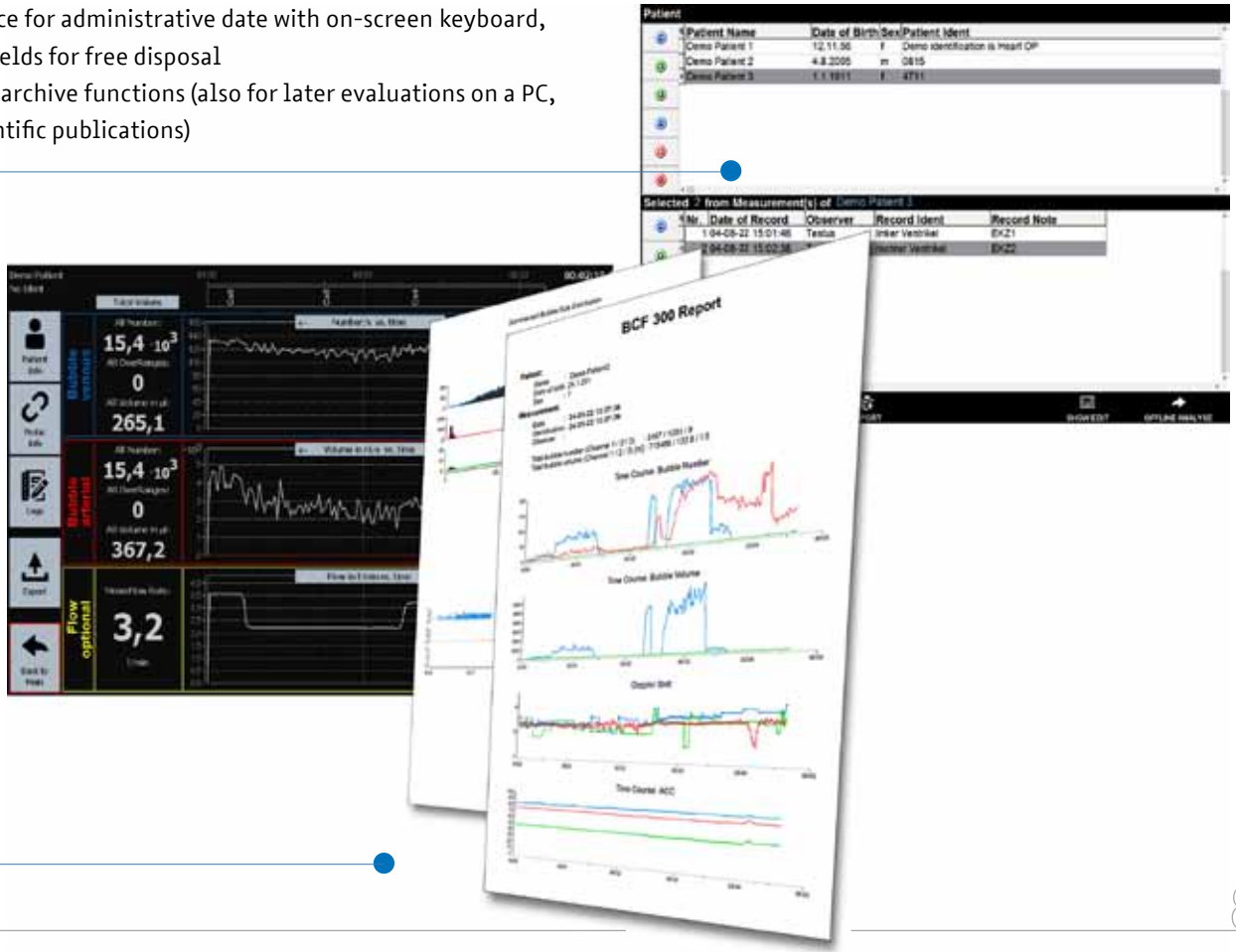
REPORT UND DOCUMENTATION

- clearly summarized administrative data and measurement information
- numeric display of the cumulated bubble number, volume and histogram of the bubble distribution
- graphic display of the time course of the complete measurement with bubble number and volume as well as bubble distribution and volume flow
- documentation as pdf or screenshot

gaMPT ULTRASONIC SOLUTIONS

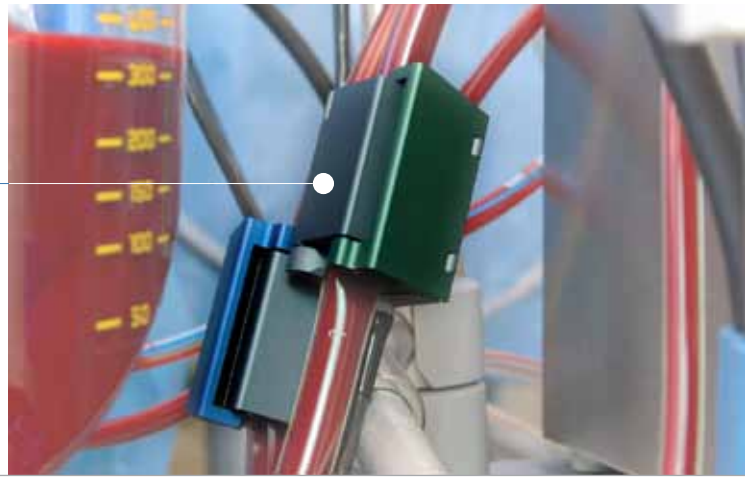
DATA MANAGEMENT

- handling of the measurements in a database
- user interface for administrative date with on-screen keyboard, additional fields for free disposal
- storage and archive functions (also for later evaluations on a PC, e.g. for scientific publications)



PATENTED PROBE DESIGN FOR IMPROVED MICROBUBBLE ANALYSIS AND VOLUME FLOW MEASUREMENT

- robust clamp-on design for easy and safe handling
- no blood contact, therefore easy cleaning
- dynamic adaptation to the specific properties of the tubes
- probes for all standard tube sizes of the ECC available
- automatic probe recognition and parameter adaptation
- color coded probes for easy localization of the bubble activity
- patent number: 10 2015 120 099



gaMPT ULTRASONIC SOLUTIONS

BCF300 – THE NEW GENERATION IN MICROBUBBLE ANALYSIS

- handy monitoring system for the extracorporeal circulation
- patented clamp-on probes without blood contact
- continuous monitoring of the bubble activity on up to three positions
- continuous monitoring of the volume flow
- precise determination of the size distribution between 20 and 2000 µm bubble diameter
- continuous display of bubble activity, size distribution and bubble volume
- acoustic signaling of the bubble activity
- record and archive functions
- automatic probe recognition
- bracket for installation on the heart-lung machine
- determination of gas concentration with the aid of gas volume and volume flow (if necessary)

GAMPT mbH
Hallesche Straße 99f
06217 Merseburg
GERMANY

Tel.: +49 3461 278 691-0
Fax: +49 3461 278 691-101

info@gampt.de
www.gampt.de