

SONOFLOW® Flow Sensor

For new mobile drive unit EXCOR® Active applied at paracorporeal, pulsatile ventricular heart assist devices



APPLICATION NOTE

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SONOTEC® has once more proven its expertise in managing complex development projects in the medical engineering sector. The project partners contracted to develop a new type of clamp-on ultrasonic sensor enabling flow measurement for all EXCOR® cannula and pump variants in combination with the new mobile driving unit EXCOR® Active. With its products EXCOR® Adult and EXCOR® Pediatric, Berlin Heart GmbH is the only company in the world to support patients of any age and body size – from infants to adults.

SONOTEC® Develops New Type of Flow Sensor for Heart Support System

In the course of the overall development of the mobile driving unit EXCOR® Active, SONOTEC® was leading the subproject for developing a new clamp-on ultrasonic sensor designed for direct volume flow measurement on flexible tubes for all cannula and pump variations of the pulsatile VAD system in combination with the new driving unit.

New Flow Sensor Development for Mobile Driving Unit EXCOR® Active

Apart from usual parameters such as high accuracy and an excellent measuring performance, the sensors were to meet a number of additional requirements such as a compact and low weight product design. Furthermore, the sensors needed to be equipped with a childproof closing mechanism and to be safe in case of the use of defibrillators. Various sensor architectures ensure them to be easily applied to all EXCOR® cannula and pump variants. Power supply and communication of the ultrasonic sensor is included to the novel drive system.

The flow sensor is a crucial part of the mobile extracorporeal blood pump EXCOR® Active, ensuring active flow measurement and constantly performing plausibility checks. Overall, the flow sensors are a key safety feature for this kind of highly complex medical technology products.

 **SONOFLOW® clamp-on sensor as a fundamental safety feature**

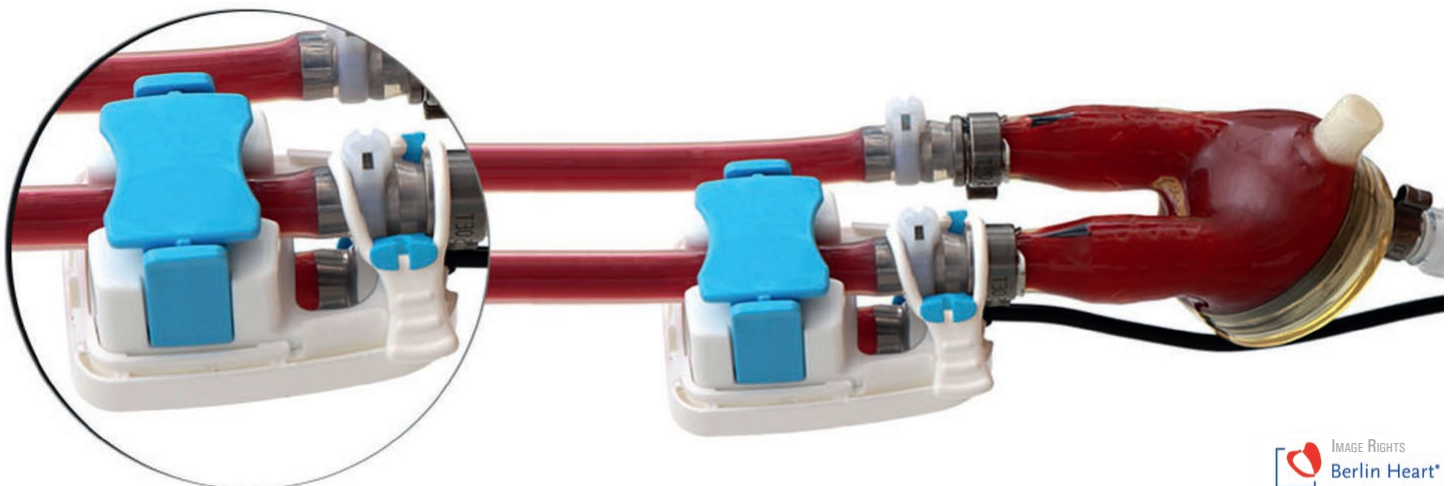


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Berlin Heart®

Visualization of a customized SONOFLOW® clamp-on ultrasonic flow sensor on an EXCOR® cannula pump model from Berlin Heart GmbH
Image Rights: Berlin Heart GmbH

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Heart Support System EXCOR® Active from Company Berlin Heart GmbH

The heart support system EXCOR® is used to mechanically aid the cardiac function for patients suffering from heart failure in later stages. It is the only paracorporeal system with regulatory approval for patients of all ages – from new-borns to adults. In addition to the support of the left heart ventricle, the EXCOR® system can also be utilized in case of failure of both heart ventricles – the so-called biventricular support.

Designed for Enhanced Child Treatment

The new mobile driving unit EXCOR® Active from Berlin Heart GmbH has been specifically designed to optimize treatment for children with serious cardiac insufficiency and excels through a number of outstanding advantages:

- Driving unit as small as a hand luggage, only 15 kg including batteries
- Battery runtime of at least 5 hours – even in BVAD mode
- Panel PC with user-friendly touch screen
- Different mobilization options for different ages



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Berlin Heart®

Driving unit EXCOR® Active for paracorporeal, pulsatile ventricular heart assist system and its portable application
Image Rights: Berlin Heart GmbH

SONOTEC® Meets Demands of Portable Equipment Industry

The project took advantage of SONOTEC's unique miniaturization, integration, low current draw as required by many new portable medical projects. SONOTEC® is leading the industry in making flow, bubble and flow-bubble sensors to meet the demand of portable equipment industry. Over a long period of successfully implemented projects, the ultrasound specialist has gained an excellent reputation

among manufacturers of ventricular assist, dialysis and transfusion devices, heart-lung machines, blood separators, medical pumps, and diagnostic systems. The intensive guidance from a very early stage in the product development process, support during verification, prototyping, and its expertise in certification processes gives SONOTEC® a lasting competitive edge.

✔ **The ultrasound specialist SONOTEC® serves innovative mobile medical technology applications with specific sensor developments.**

SONOTEC® preserves the right to change technical specifications without further notice. (Rev. 1 / 2020-06-03)

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