

Introduction

This info sheet gives a brief description of a 4-step fast track Pressure-Volume measurement and monitoring protocol.

Short Overview / Contents

1. **Choice of catheter**
2. **Study preparation**
 - a. Check battery time
 - b. Enter study settings; copy settings from a previous study to use the same settings.
 - c. Pressure calibration; can be performed once and is not required for each study thereafter.
3. **Catheter**
 - a. Connect catheter for automatic calibration (1min) to Sentron Interface prior insertion
 - b. Optimal positioning -> pigtail in apex, segment 7 around aortic valve (< .5 cm under valves)
 - c. Fixation catheter when optimal position reached.
4. **Measurement**
 - a. Place ECG markers.
 - b. Apply filtering 10 (CRT) or 25 low pass filter (synchronous ventricles)
 - c. Determination of absolute stroke volume by thermodilution (4-5 randomly applied injections)
 - d. Determination of parallel conductance with hypertonic saline.

Optional

Instead of using thermodilution and saline injections to determine Alpha and Vc it is also possible to calculate Alpha and Vc using MRI- or Echo-values (when reliable).

Read also infosheet '[Calibration tips](#)'.

1. Choice of Catheter


Optimal pressure-volume recordings require that you use the right catheter. To read more information on catheter size and how to optimize catheter settings, read info sheet '[Select the best catheter](#)'.

Electrode spacing is dependent on the ventricular long-axis:

- < 50mm - 6 mm electrode spacing
- < 65mm - 8 mm electrode spacing
- < 80mm - 10 mm electrode spacing
- > 80mm - 12 mm electrode spacing

2. Study preparation

Check Battery time

Activate the patient module by pressing the catheter button  to check battery time displayed at the status bar. Deactivate the patient module by pressing the catheter button again to save battery time during the setup of the CFL-512.

If not satisfied with the minimal available time, put module on the charger during set-up of the CFL-512.

Note

Click on [battery management](#), to learn more about using the patient module battery.

Enter study settings

During preparation of the patient, enter study settings. Start with creating a new study. You should at least fill in a study name and an ID number.

- Select "Scaling" and check values. Normally during start-up all channels are set to 'Auto-scale'.
- Select "Catheter" in the settings menu. Enter the current catheter that will be used.
- Select "Channels" in the settings menu. If necessary check and update the channel names and units for the external signals. Also check channel-view assignment. The pressure will be used in the PV-loop and the ECG will be used to find the markers.
- Calibrate pressure can be done off-line. Please note that it is not always necessary to calibrate the pressure. Check the values for 0 mmHg and 100 mmHg once a month. The calibration values will be copied from the last used study.
- Rho measurements are not required for clinical use, therefore set in each study a fixed value (100)
- The calibration of the conductance catheter is done automatically, however the user-supplied signals connected to the external inputs require initial calibration to enable the software to convert input signal voltages to user units.

Note

Select 'Create new study' during start-up, you will be guided through these steps automatically.

3. Connecting catheter

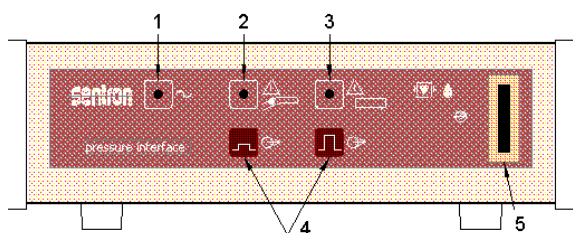
Catheter connection

Flush catheter with saline, and immerse the pressure-sensor for about 10 seconds in saline. Lay catheter on sterile table and cover sensor with sterile wet gauze. Connect the catheter's pressure connector (No 5) to the socket on the pressure interface.

Important

The pressure sensor should not be touched until the 'sensor inoperative' indicator (No 2) turns off (after approximately 1 minute).

If indicator starts blinking, the pressure sensor of the catheter is not working. Do not use this catheter. Send this catheter back to CD Leycom for replacement.



Optimal positioning

Important

Use pressure recordings and fluoroscopy or long-axis view of Echo for LV catheterization.

Activate patient module when catheter reaches the ventricle. If not done yet, connect volume-arm of catheter to the patient module. It is recommended to use an extension cable CCBL-BBD-1.5M.

Select screen with the segmental volumes display and check the ventricular volume segments, to see whether the respective segmental signals are in or out of phase.

Optional

If 5 or less segments are measured in the ventricle, decrease the electric field by changing the current electrodes.

Use 11 electrodes with 5 segments.

Use 10 electrodes with 3 or 4 segments.

It also is recommended in case of major dyssynchrony to check the loops at 12, 11 or 10 electrodes.

4. Measurements

Start your measurements always with a baseline recording. Record transitions in treatment (CRT settings).

Place markers

To see real-time indices you need to place markers. Select 'Markers' in the analysis menu and place a checkmark at 'Use markers'. Choose one of the 6 options to place the markers.

When you want to record/monitor absolute values start immediately with the thermodilution and hypertonic saline dilution or calculate Alpha and Vc using the Echo values EDV and ESV (Read also infosheet '[Calibration tips](#)').

Determination of absolute volumes (Alpha)

Determine CO by a reference method following standard procedure. Thermodilution should be performed 4-5 times to achieve a reliable average. Each time Cardiac Output is measured, conductance catheter data should be acquired simultaneously.

Enter the value of the reference method in your comment and select the type 'Alpha' (=calibration constant).

Determination of parallel conductance volume (Vc)

Acquire the Vc-files during a saline injection. Use 10 ml of 6% with a CO less than 7 L/min and use 10 ml of 10% with a CO above 7 L/min, preferably injected in distal lumen of Swan Ganz catheter. Start data-acquisition and inject the hypertonic saline. The PV-loops will move to the right because ventricular conductance will increase. Wait for the washout of the saline then stop acquisition. Fill in a comment and select the type 'Vc'. If you calculate Vc try this first without using the criteria.

Note

It is recommended to wait a while before repeating a saline injection. In the mean time calculate Vc directly and/or calibrate CO.

Whenever the Vc measurement is out of range redo the measurement. We advice to take at least 3 Vc measurements and immediate analysis.

Important

Always check the zero level of the pressure sensor the moment the catheter is removed from the patient. Easiest way: start recording before the catheter is removed.