

**CD LEYCOM SIGMA 5 DF**  
Cardiac Signal Conditioner - Processor

*Continuous on-line ventricular volume  
measuring by conductance catheter*



## SIGMA 5 DF

Cardiac Signal Conditioner – Processor



### Sigma 5 DF

The **CD Leycom Sigma 5 DF** is an electronic signal conditioner - processor, enabling continuous calibrated measurement of ventricular volume. The conductance catheter technique developed by Professor Baan (*Baan et al, Circulation 70; 1984*) is recognized as the "gold standard" for the determination of cardiac chamber volume. Combined with real time measurement of pressure, the Sigma 5 DF is a complete system for the study of cardiac function by pressure - volume loop analysis.

### CD Leycom Conductance Catheters

The CD Leycom combination catheter provides both real time volume and pressure data from a single catheter positioned in the ventricle.

The dual field (DF) catheter has 12 conductance electrodes for measurement of 5 volume segments and a single solid-state pressure sensor.

Two such catheters can be used to record bi-ventricular pressure- volume relationships.

The Sigma 5 DF may be used with catheters supplied by CD Leycom or from other manufacturers using appropriate adaptors. CD Leycom will also discuss custom requirements for pressure and volume catheters.

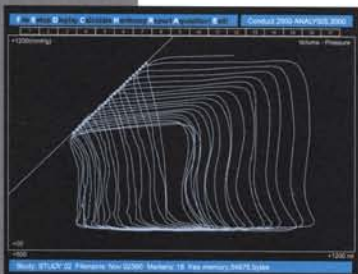
### Conduct 2000

Data from **Sigma 5 DF** measurement sessions may be analyzed at a convenient time using the optional Conduct 2000. Conduct 2000 is a 16-channel A-D converter and custom software which link the **Sigma 5 DF** to a personal computer.

Conduct 2000 enables the acquisition, display and analysis of time varying volume, pressure and ECG data.

Pressure-volume loops provide important parameters of myocardial performance, such as the end systolic and end diastolic pressure volume relationships.

The Sigma 5 DF also measures and reports a comprehensive array of haemodynamic parameters.



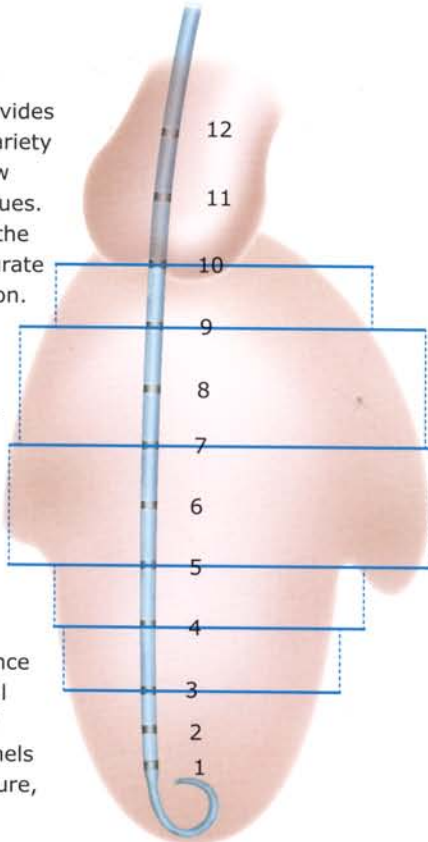
## Application of the Sigma 5 DF

Analysis of beat-to-beat pressure-volume data provides quantitative assessment of cardiac function in a variety of research situations enabling investigation of new pharmacological, surgical or interventional techniques. Conductance assessment of ventricular volume is the method of choice where the protocol requires accurate load independent assessment of myocardial function.

Acquisition of pressure-volume data with the Sigma 5 DF is easily achieved with the insertion of a single, pressure-volume combination catheter incorporating electrodes for the measurement of 5 segmental volumes and a high fidelity solid-state pressure sensor to accurately register intra-ventricular pressure.

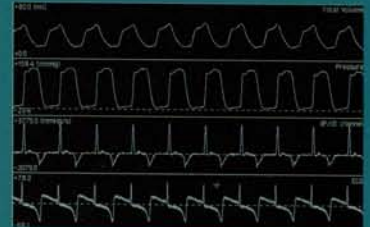
With the Sigma 5 DF and Conduct 2000, it is possible to acquire and display up to 16 channels of data simultaneously. Signals from the conductance combination catheter including volume, an external pressure signal and an intra-ventricular ECG use 7 of the available channels, leaving 9 auxiliary channels for other physiological signals such as aortic pressure, flow or temperature.

The Sigma 5 DF is capable of acquiring data from large and small subjects (rabbits and rats). For measurement in small ventricles or atria, the Sigma 5 DF also has a single field (SF) facility.

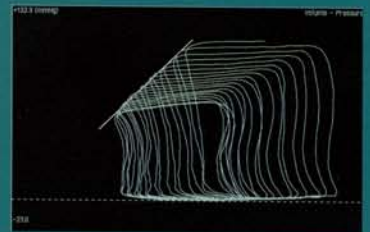


Systolic, diastolic and general parameters registered by the Sigma 5 DF system include:

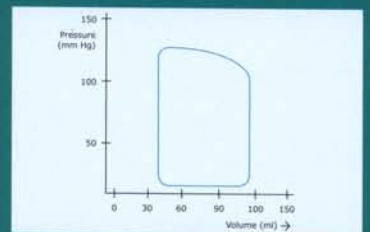
ESPVR	EF	EDV
dp/dt - Ved	SW	dp/dtmin
PRSW	ESP	DFT
HR	ESV	Tau
Vmax	dp/dtmax	PFR
Vmin	PER	TPfr
SV	tPer	
CO	EDP	



Comprehensive real time data display of volume, pressure and ecg



Pressure-volume loop display during venous occlusion showing ESPVR



Left ventricle pressure-volume loop during one cardiac cycle

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### SIGMA 5 DF Specifications

The basic Sigma 5 DF is comprised of the following modules, housed in a metal cabinet:

#### Electrically floating input modules

- 20 kHz, 0.03 mA current source.
- Signal conditioner for each segment/channel
- Integrated switching capability to adapt effective catheter length to ventricular axis length with automatic adaptation for volume calculation
- Possibility to apply single field (SF) or dual field (DF) current to catheter

Note: The combination of length adaptation and dual field requires a 12-electrode catheter.

#### Signal processor module

5 segments, with thumb-wheel switches to set:

- Catheter electrode spacing
- Blood resistivity
- Calibrated volume values in steps of 1 ml.

#### Digital read-out module

- Measuring blood resistivity, using supplied calibrated cuvette
- Measuring calibration volume signals

#### Analogue outputs

- 5 segmental and total volume signals
- Auxiliary signals for recording to other acquisition systems

#### Optional Display Module

- Ventricular contour display module for graphical viewing of time-varying intraventricular contour.
- The module may also be used for alphanumeric display of heart rate, stroke volume or cardiac output

#### Accessories

- Blood resistivity cuvette.
- Catheter connection cables.
- Dummy catheter and resistance plugs for calibration



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