

# InterSim<sup>®</sup> III Touch

Interactive Heart Simulator

Your virtual patient.



The InterSim<sup>®</sup> III Touch is used to simulate the human heart. In combination with the InterSim<sup>®</sup> III Adapter Box, the electrical and electrochemical properties of the cardiac system of humans can be simulated and the interaction with implantable pacemakers and defibrillators can be learned.

## HIGHLIGHTS

- ▶ Self-contained device
- ▶ Easy to use software
- ▶ Full support of IS-1, IS-4, DF-1 and DF-4
- ▶ Support for all shock vectors
- ▶ Classroom compatible
- ▶ Additional adapter box for safe handling of ICDs
- ▶ High voltage resistant (up to 1500 V)
- ▶ CE certification
- ▶ NRTL certification for US and Canada

## APPLICATION VARIANTS

<b>InterSim<sup>®</sup> III Adapter Box</b>	Connection of implantable pulse generators (CRT-P, CRT-D or ICD)
	Standard version (support for IS-1; optionally DF-1 or DF-4)
	Extended version (support for IS-1 and IS-4; optionally DF-1 or DF-4)

<b>InterSim<sup>®</sup> III Adapter for Temporary Pacemaker</b>	Connection of 2-channel external pacemakers
	Two different connection types (2 mm banana plugs and Medtronic compatible connectors)

## SYSTEM INFORMATION

Due to the self-contained system no separate computer is required.

- Based on Windows<sup>®</sup> 10 tablet
- 10.1" capacitive multi-touch display
- Simulator software pre-installed (update-capable)
- Kiosk mode operation (Customized setup with assigned access and reduced maintenance)
- Pen operation possible
- Fanless cooling
- Presentation mode via docking station
- Accessories available (e. g. docking station, stable frame)



## FEATURES

### Basic functionalities

<b>Device types</b>	Two chamber Biventricular Quadripolar
<b>Rhythms</b>	Sinus Rhythm, Sinus Brady, Sinus Arrest Idioventricular Rhythm Sinus Tachy, Brady-Tachy Syndrome, Paroxysmal Atrial Tachy Atrial Flutter, Atrial Fibrillation, AVNRT, Combined Atrial Flutter/Fibrillation LV Tachy (slow, medium, fast, very fast) RV Tachy (slow, medium, fast, very fast) Polymorphous VT, Torsade de Pointes Ventricular Flutter, Ventricular Fibrillation Dual tachycardia
<b>Blocks</b>	1:1 conduction AV Block I AV Block II Mobitz II (2:1, 3:1, 4:1) AV Block II Mobitz I AV Block III Retrograde Conduction Accessory Pathway LBBB RBBB
<b>Visualization</b>	Showing of up to 7 ECG traces (with time measurement functionality) 4 different 'sweep speeds' 3 different sizes of ECG display Stopping and reviewing ECG (up to 8 min back) Saving InterSim III ECG as Jpg
<b>Miscellaneous</b>	Saving and reloading states of the simulator including all settings Developing of self-running scenarios (macros) Support of all possible sensing and pacing vectors Support for all shock vectors (±RV coil – SVC coil    CAN, ±RV coil – CAN, ±RV coil – SVC coil) Measurement of shock energy, polarity and vector

### Parameters

<b>Rates</b>	Atrial AVN Ventricular	2...245 bpm 2...200 bpm 2...250 bpm
<b>Intervals</b>	PR RP Block rate Coupling Vulnerable phase BBB QRS width RV-LV	50...400 ms 130...600 ms 20...250 bpm 100...1000 ms 40...80 ms 80...220 ms 10...[BBB QRS width] ms
<b>Thresholds</b>	A, RV, LV RV coil	0.5...3.75 V (no capture; strength-duration curve) 0...80 J (25 % variation optional)
<b>Workload</b>		0...100 %
<b>Far-field R-wave</b>	Status Intrinsic VA interval Paced VA interval	off, small, large 0...100 ms 50...200 ms
<b>Amplitude T-Wave</b>		normal, medium, large, extra-large, high angle
<b>A-pace crosstalk</b>	Latency Width	0...50 ms 5...102 ms
<b>A-Pace-P latency</b>		1...150 ms
<b>V-Pace-Q latency</b>		1...150 ms
<b>Defects</b>	A, RV, LV RV coil	normal, fracture, leakage, scar fracture
<b>EMI for pacemaker/ICD</b>		50/60 Hz 5 mV, 50/60 Hz 0.5 mV, artifacts, noise
<b>Miscellaneous</b>	Chances (ATP) ERAF (early recurrence of AF) ERVT (early recurrence of VT) Post shock asystole (up to 180 ms)	



## DEVICE DATA

<b>Size</b>	
Basic device	270 x 180 x 65 mm
Adapter Box	150 x 125 x 60 mm
<b>Ambient temperature</b>	
Operation	+5...+40 °C
Storage / transport	-20...+60 °C
<b>Max. relative humidity (non-condensing)</b>	90 %

## ELECTRICAL DATA

## Surface ECG

<b>Channels (limb lead)</b>	LA (aVL), LL (aVF), RA (aVR), RL (connected to ground)
<b>Surface ECG output</b>	
Amplitude	-50...+50 mV ( $\pm 5$ %)
Frequency	1 kHz
<b>Output impedance</b>	510 $\Omega$

## Intracardiac ECG

<b>Channels</b>	
Terminal pin IS-1	A, RV, LV (always tip/ring)
Terminal pin IS-4	LV (LV1-LV4)
HV terminal DF-4	RV (tip/ring)
<b>Intracardiac ECG output</b>	
Amplitude	-30...+30 mV ( $\pm 10$ %)
Frequency	1 kHz
<b>Pulse detection</b>	
Pulse amplitude	0.4...7.5 V
Pulse duration	0.1...20 ms
Max. measurement error	$\pm 2$ % (Amplitude) / $\pm 1$ % (Duration)
<b>Input impedance (unipolar)</b>	
normal	170...550 $\Omega$ ( $\pm 5$ %)
leakage / short cut	50 $\Omega$ ( $\pm 5$ %)
fracture / broken	> 5000 $\Omega$
<b>Input impedance (bipolar)</b>	
normal	300...1000 $\Omega$ ( $\pm 5$ %)
leakage / short cut	100 $\Omega$ ( $\pm 5$ %)
fracture / broken	> 5000 $\Omega$
<b>Input voltage protection</b>	1.5 kV

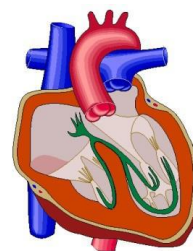
<b>Max. altitude during operation</b>	2000 m above sea level
<b>Place of use</b>	Indoor use only
<b>Power supply</b>	100 – 240 V AC, 50 – 60 Hz
<b>Battery powered operation</b>	~3 hours
<b>Country-specific plug attachments</b>	EU, UK, US


## Defibrillator channels

<b>Channels</b>	
HV terminal DF-1	RV coil, SVC coil
HV terminal DF-4	RV coil, SVC coil
<b>Intracardiac ECG output</b>	
Amplitude	-12...+12 mV ( $\pm 10$ %)
Frequency	1 kHz
<b>Defibrillator pulse detection</b>	
Pulse amplitude	-1.5...+1.5 kV
Max. pulse energy	80 J
Max. measurement error	$\pm 10$ % (amplitude) / $\pm 2.5$ % (energy)
<b>Input impedance</b>	
RV coil to CAN	79 $\Omega$ ( $\pm 5$ %)
RV coil to SVC coil	50 $\Omega$ ( $\pm 5$ %)
RV coil to SVC coil    CAN	40 $\Omega$ ( $\pm 5$ %)
RV coil (fracture / broken)	open
<b>Pause times between defibrillator pulses</b>	
After single pulse	$\geq 60$ s
After pulse series (max. 5 pulses)	$\geq 180$ s
<b>DC fibber detection (via RV coil)</b>	
Pulse amplitude	6.2 V (typ.)
Pulse duration	1.9 s

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 InterSim® III is a joint venture product between Ingenieurbüro Lang and TQ-Systems GmbH. Production, sales and service for the product is carried out exclusively by TQ-Systems GmbH.