

Heartsim[®] 200

– Directions for Use
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Limited Warranty

Laerdal warrants to the purchaser that its product(s) is/are free from defects in material and workmanship for a period of one (1) year from the date of purchase by the original user. During the designated one (1) year period, Laerdal will, upon receipt of a product found to be defective due to materials or workmanship from the purchaser and notification in writing of the defect at its option repair or replace any parts found to be defective or the entire product.

Products found to be defective and notification of defects may also be sent to the authorized Laerdal dealer from whom the product was purchased. All postage, shipping, or handling charges shall be the sole responsibility of the purchaser.

Laerdal is responsible for the effects of safety, reliability and performance of its product(s) only if:

- Service, repair, readjustment or modification is carried out by Laerdal or persons authorized by Laerdal.
- The electrical installation of the room where the product is used complies with pertinent national requirements.
- The product is used in the proper manner in strict compliance with its Directions for Use.

Laerdal shall not be liable under this warranty for incidental or consequential damages or in the event any unauthorized repairs or modifications have been made or attempted or when the product, or any part thereof, has been damaged by accident, misuse or abuse. This warranty does not cover batteries, fuses, normal wear and tear, staining, discoloration or other cosmetic irregularity which does not impede or degrade product performance.

Some states in the USA do not allow the exclusion or limitation of incidental or consequential damages, so those limitations or exclusions may not apply to you.

There are no other express or implied warranties, whether of merchantability, fitness or purpose, or otherwise, on the product, its parts and accessories.

Cautions and Warnings

When using the Heartsim 200 together with a training manikin and defibrillator, the warnings and cautions given in their respective Directions for Use must be followed.

Do not open the Heartsim 200 case, there are no user serviceable parts. Refer the unit to a qualified service technician.

This device generates, uses and can radiate radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. In that case the user is encouraged to try to correct the interference by:

- Reorienting or relocating the receiving antenna.
- Increasing the distance between the device and the receiver.
- Connecting the device into an outlet on a circuit different from that to which the receiver is connected.
- Consulting the dealer or an experienced radio/TV technician for help.

1. Introduction

The Heartsim 200 is a battery powered ECG rhythm simulator which provides simulation of basic, modified and pediatric rhythms with the applicable pulse rate and strength. Dedicated controls and indicators for each function make the Heartsim 200 simple to use.

The Heartsim 200 has been designed to be used with the ALS Skilltrainer and ALS Baby Trainer. However, by using the Heartsim 200 link cable (cat. No. 29 20 21) the following manikins can also be used with the Heartsim 200, although no pulse is generated:

- Skillmeter Arrhythmia Trainer
- Early Defibrillation Trainer
- Basic ALS Trainer.

The Heartsim 200 can also be used as a stand-alone unit to provide ECG signals for display on any standard 3-lead ECG monitor.

This Directions for Use provides all the information to fully utilise the Heartsim 200 but does not aim to provide related medical knowledge.

Note: The training manikins are supplied with their own Directions for Use.

2. Description

The Heartsim 200 is a hand held unit with the function keys incorporated on the top panel. Every key (with the exception of the Paroxysmal and Change rhythm keys) has an associated LED to indicate the status of its function. The unit connects to the manikin by plugging the cable into the top end of the unit or via the ECG mounts on the top of the control panel.

The rear of the unit contains the battery compartment.



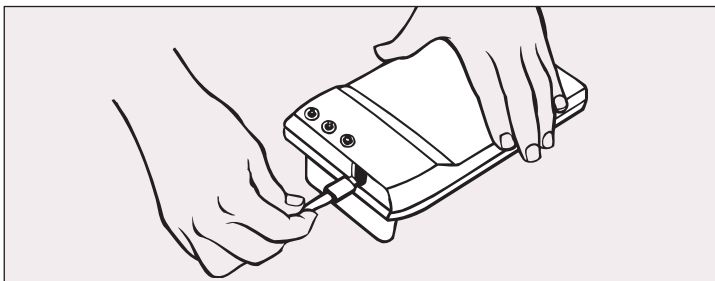
3. Getting Started

3.1 Unpacking

Remove the Heartsim 200 from its packaging.

If there is any obvious sign of damage, immediately notify Laerdal Medical and the carrier. Remove the battery cover and then remove the battery tag that is temporarily installed to prevent discharge of the batteries.

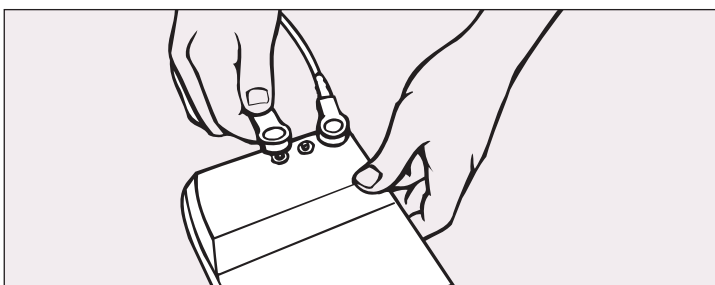
3.2 Connecting the Heartsim 200



3.2.1 Connecting the Manikin

To connect the ALS Skilltrainer to the Heartsim 200, connect the cable from the side of the manikin to the connector on the top end of the Heartsim 200. This port also accepts the Heartsim 200 link cable plug.

Note: The plug will only enter the receptacle with the correct orientation.



3.2.2 Connecting the ALS Baby Trainer

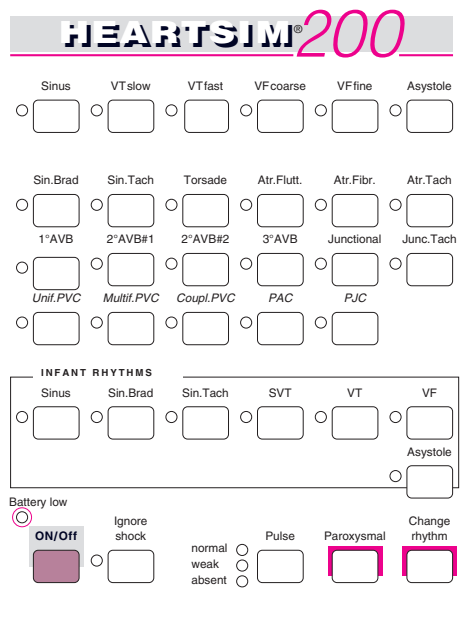
Connect the manikin's three connectors onto the ECG mounts on the top of the control panel. These mounts can also connect directly to an ECG monitor for rhythm recognition training.

4. Operation

4.1 General

4.1.1 Power On/Off

To switch on the Heartsim 200, simply press the On/Off key.
To switch off the Heartsim 200, press the On/Off key a second time.
To conserve battery power, the Heartsim 200 automatically switches off after approximately 10 minutes if there has been no user activity.



4.1.2 Battery Low Indication

The yellow Battery low LED switches on to indicate that battery power is low and that the batteries should be replaced. See section 5.2.1 for battery removal/replacement. The Heartsim 200 will operate after the battery low LED is lit, but when the battery voltage is too low, the unit will switch automatically off.

Note: The amplitude of the ECG and pulse strength may be affected when the Battery low LED is lit.

4.2 ECG Rhythms

The ECG rhythms can be selected from their own dedicated controls on the keyboard. Each rhythm has its own key and green LED indicator that tells you which rhythm has been selected and its status. The Heartsim 200 has keys for the following rhythms:

Basic Rhythms

Key Marking	Rate	Descriptive Name
Sinus	80	Normal Sinus Rhythm (NSR)
VT slow	120	Ventricular Tachycardia, slow
VT fast	220	Ventricular Tachycardia, fast
VF coarse	-	Ventricular Fibrillation, coarse
VF fine	-	Ventricular Fibrillation, fine
Asystole	-	Asystole.

HEARTSIM[®]200

☐ Sinus ☐ VTslow ☐ VTfast ☐ VFcoarse ☐ VFfine ☐ Asystole

☐ Sin.Brady ☐ Sin.Tach ☐ Torsade ☐ Atr.Flutt. ☐ Atr.Fibr. ☐ Atr.Tach

☐ 1°AVB ☐ 2°AVB#1 ☐ 2°AVB#2 ☐ 3°AVB ☐ Junctional ☐ Junc.Tach

☐ Unif.PVC ☐ Multif.PVC ☐ Coupl.PVC ☐ PAC ☐ PJC

INFANT RHYTHMS

☐ Sinus ☐ Sin.Brady ☐ Sin.Tach ☐ SVT ☐ VT ☐ VF

☐ Asystole

Battery low
☐ ON/Off ☐ Ignore shock normal weak absent ☐ Pulse ☐ Paroxysmal ☐ Change rhythm

Modified Rhythms

<i>Key Marking</i>	<i>Rate</i>	<i>Descriptive Name</i>
Sin. Brad	40	Sinus Bradycardia
Sin. Tach	140	Sinus Tachycardia
Torsade	-	Torsade des Pointes
Atr. Flutt	150	Atrial Flutter
Atr. Fibr	140	Atrial Fibrillation
Atr. Tach	210	Atrial Tachycardia
1°AVB	60	1st Degr. AV Block
2°AVB #1	80, 4:3	2nd Degr. AV Block #1
2°AVB #2	80, 2:1/3:1	2nd Degr. AV Block #2
3°AVB	50	3rd Degr. AV Block
Junctional	50	Junctional Rhythm
Junc. Tach	120	Junctional Tachycardia
Unif. PVC	80	NSR with Unifocal PVCs
Multif. PVC	80	NSR with Multifocal PVCs
Coupl. PVC	80	Sinus with Coupled PVCs
PAC	80	Sinus with PACs (Premature Atrial Complex)
PJC	80	Sinus with PJCs (Premature Junctional Complex)

HEARTSIM[®] 200

☐ Sinus
 ☐ VTslow
 ☐ VTfast
 ☐ VFcoarse
 ☐ VFfine
 ☐ Asystole

☐ Sin.Brads
 ☐ Sin.Tach
 ☐ Torsade
 ☐ Atr.Flutt.
 ☐ Atr.Fibr.
 ☐ Atr.Tach

☐ 1°AVB
 ☐ 2°AVB#1
 ☐ 2°AVB#2
 ☐ 3°AVB
 ☐ Junctional
 ☐ Junc.Tach

☐ Unif.PVC
 ☐ Multif.PVC
 ☐ Coupl.PVC
 ☐ PAC
 ☐ PJC

INFANT RHYTHMS

☐ Sinus
 ☐ Sin.Brads
 ☐ Sin.Tach
 ☐ SVT
 ☐ VT
 ☐ VF

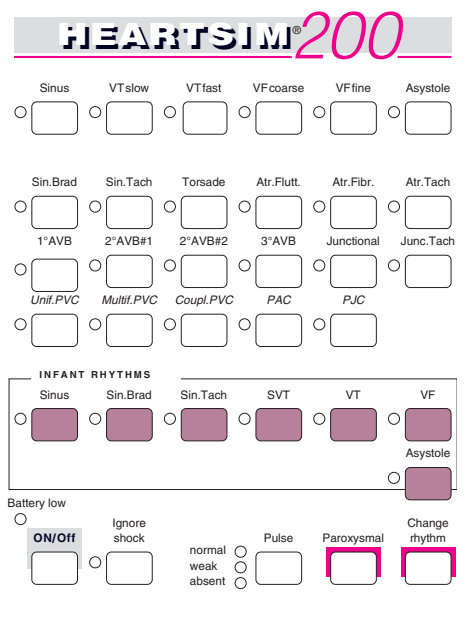
☐ Asystole

Battery low ☐

☐ ON/OFF
 ☐ Ignore shock
 normal ☐ Pulse ☐ Paroxysmal ☐ Change rhythm
 weak ☐
 absent ☐

Infant Rhythms

Key Marking	Rate	Descriptive Name
Sinus	130	Normal Sinus Rhythm (NSR)
Sin. Brad	80	Sinus Bradycardia
Sin. Tach	180	Sinus Tachycardia
SVT	280	Supraventricular Tachycardia
VT	210	Ventricular Tachycardia
VF	-	Ventricular Fibrillation
Asystole	-	Asystole



4.2.1 Running/Waiting Rhythm Indication

The green LED indicator next to the key shows you which rhythm has been selected and its status. A flashing LED denotes a waiting rhythm and a steady LED denotes a running rhythm.

4.2.2 Default Rhythm

The default running rhythm when you switch on the Heartsim 200 is the Normal Sinus Rhythm (NSR).

4.2.3 Selecting a New Rhythm

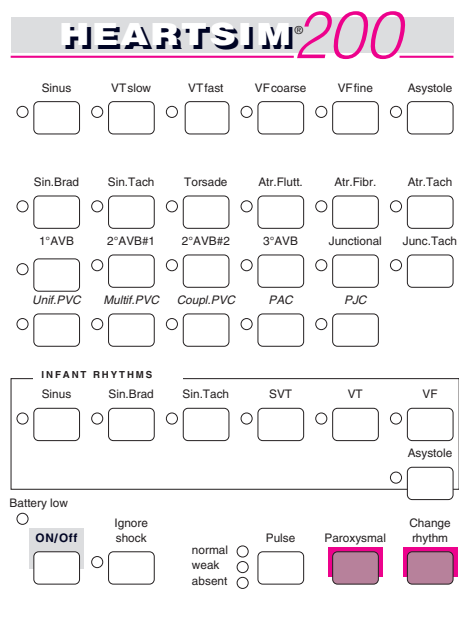
To select a new rhythm simply press the key of the new rhythm you require. Your new selection is indicated as a waiting rhythm. To activate, see next page.

4.3 Activation of a New Rhythm

There are three methods to activate a new rhythm:

4.3.1 Use the Change Rhythm Key

When you push the Change rhythm key the present selected running rhythm is deactivated and the selected waiting rhythm becomes the new running rhythm.



4.3.2 Defibrillation of the Manikin

Defibrillation of the manikin deactivates the selected running rhythm and the selected waiting rhythm becomes the new running rhythm, unless the Ignore Shock button is on.

4.3.3 Paroxysmal Function

When you push the Paroxysmal Function key you can alternate between a running rhythm and a waiting rhythm.

4.4 Ignore Shock Function

When you push the Ignore shock key, the detection of the shock is ignored and the status of the ECG rhythm stays the same. This function is engaged until you push the Ignore shock key again.

HEARTSIM[®]200

Sinus	VTslow	VTfast	VFcoarse	VFfine	Asystole
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Sin.Brad	Sin.Tach	Torsade	Atr.Flutt.	Atr.Fibr.	Atr.Tach
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
1°AVB	2°AVB#1	2°AVB#2	3°AVB	Junctional	Junc.Tach
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Unif.PVC	Multif.PVC	Coupl.PVC	PAC	PJC	
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	

INFANT RHYTHMS

Sinus	Sin.Brad	Sin.Tach	SVT	VT	VF
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
					Asystole
					☐ ☐

Battery low
☐

ON/Off	Ignore shock	normal	Pulse	Paroxysmal	Change rhythm
☐	☐	weak	☐	☐	☐
		absent	☐		

4.5 Pulse Function

4.5.1 Default Pulse Strength

The default pulse strength when you switch on the Heartsim 200 is Normal. Since the default rhythm is NSR, the pulse strength that will be felt on the manikin will be similar to the normal pulse on a healthy individual.

4.5.2 Pulse Strength Selection

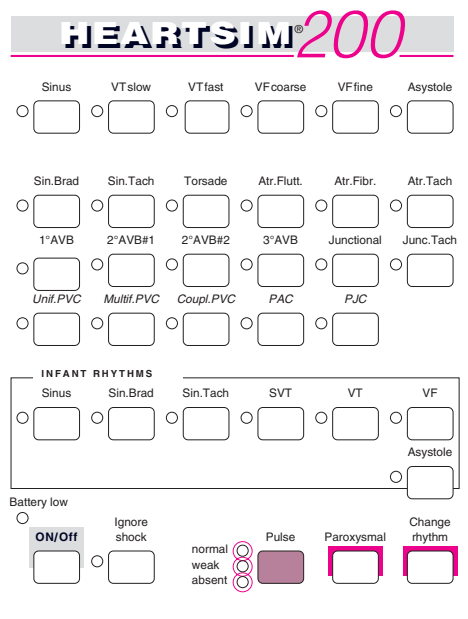
You can select three different pulse strengths:

- Normal
- Weak
- Absent.

A single push of the Pulse key changes the pulse strength selection from the default strength (Normal) to Absent. The next push changes the pulse strength to Weak, and the next returns it to Normal. Further pushes of the Pulse key change the selection sequentially. The pulse rates simulated in the Normal and Weak settings will depend upon selected rhythm.

4.5.3 Indication

Each pulse strength has its own green LED that comes on to show you which pulse strength has been selected.



Note: The ALS Baby Trainer has a manually operated pulse.

5. Maintenance

5.1 Trouble Shooting

The Heartsim 200 is designed to be a reliable unit requiring a minimum of maintenance. With this in mind, there are only a few faults the user can rectify. In all other cases contact Laerdal Medical, or your Laerdal dealer for authorized servicing or repair.

Problem	Correction
Battery Low LED is on	- Replace batteries
No ECG signals displayed	- Check all connections
No pulse simulation	- Check to see if battery low LED is on. - Check manikin cable connection. - Check type of manikin (see page 4). - <i>ALS Skilltrainer only:</i> Pulse is pressed down on both sides simultaneously.

5.2 Servicing

5.2.1 Battery Removal/Replacement

To remove and replace the batteries:

- Remove the battery cover on the rear of the Heartsim 200.
- Remove and safely discard the old batteries.
- Install the new batteries, AA size (R6) 1.5V, in the correct orientation as shown on the cabinet bottom.
- Re-fit the battery cover.

5.3 Cleaning

5.3.1 General

Cleaning of the Heartsim 200 is restricted to general cleaning of the keyboard and case:

- Moisten a cloth with a suitable cleaning agent. Use a mild soap or cleaner.
- Gently wipe the surface of the keyboard and case.
- Remove any excess liquid with a dry cloth.
- Do not immerse the unit in water.

6.Parts List

26 00 10	Heartsim 200
26 10 00	Soft pack
26 10 20	Battery case lid
26 04 20	Directions for use Heartsim 200

Extra Equipment

29 20 21	Heartsim 200 link cable
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If increased battery life is needed, there is an extra battery pack available which is mounted in ALS Skilltrainer.
See ALS Skilltrainer Directions for Use.

Product specifications are subject to change without notice.

7. Technical Data

Environmental Data

- | | |
|------------------------|---------------------------------|
| - Temperature | 10°C to 40°C |
| - Humidity | 15 to 90% RH (non - condensing) |
| - Atmospheric pressure | 70 kPa to 106 kPa |

Power Supplies

- | | |
|-----------------------------------|---|
| - Power supply | 9V from internal batteries |
| - Batteries | AA size (R6) 1.5V |
| - Number of batteries | 6 |
| - Capacity | 2500 mAh |
| - Battery life time | Approx. 12.5 hours until the unit switches automatically off.
This is under the following conditions:
Normal Sinus Rhythm
Pulse active max. 10 sec./min.
20°C |
| - Battery low indicator operation | 6.6 +/- 0.2 VDC |

Storage

- | | |
|---------------|---------------------------------|
| - Temperature | - 15 to + 50°C |
| - Humidity | 15 to 90% RH (non - condensing) |

Physical Dimensions

- | | |
|--------------------------|-------------------|
| - Size | 233 x 132 x 63 mm |
| - Weight incl. batteries | 0.5 kg |

Symbols used



Type B in accordance with IEC-601.

Standards/Approvals



The product is in compliance with essential requirements of council directive 89 / 366 / EEC; EMC - directive.

Limit B of EN 55011/1991 (CISPR 11/1990)

Limit B of VDE 0871 / 6.78 with amendments of Amtsblatt no 163 / 1984 Vfg. 1046

Limit B of FCC rules and regulations part 15, subpart B.

EN 50082 -1 / 1992 (IEC 801-2, -3, -4).

IEC 601-1