

OPERATING INSTRUCTIONS

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Controls and Indicators

Symbio CS1201 CODE SIMULATOR

ON-OFF

LOW BATT ●

DEFIB DSCHG ●

convert

PACER PULSE ●

capture

Buttons: VF, VT-HI, VT-LO, T de P, AFIB, AFLTR, PSVT, S TACH, ANT ST↓, NSR, ASYS, SINUS, SINUS AMI, AMI PVC, SINUS ANT-S ST↑, 2nd I, LAT ST↑, S BRDY, INF ST↑, IMI, 1st, 2nd II, 2nd II, 3rd, RBBB, LBBB PVC, LBBB

ON-OFF
Press to power-on and to power-off.

LOW BATT
Red indicator illuminates when battery should be replaced.

DEFIB DSCHG
Green indicator illuminates for two seconds when discharge is delivered from defib set to 50J or more.

convert
When enabled, a pre-selected rhythm becomes the running rhythm when a defib delivers 50J or more.

PACER PULSE
Brightness indicates pacing capture level selected.

capture
Selects capture current levels: 70, 80, 90 and 100 mA and "ignore".

convert
When enabled, a pre-selected rhythm becomes the running rhythm, when a defib delivers 50J or more.

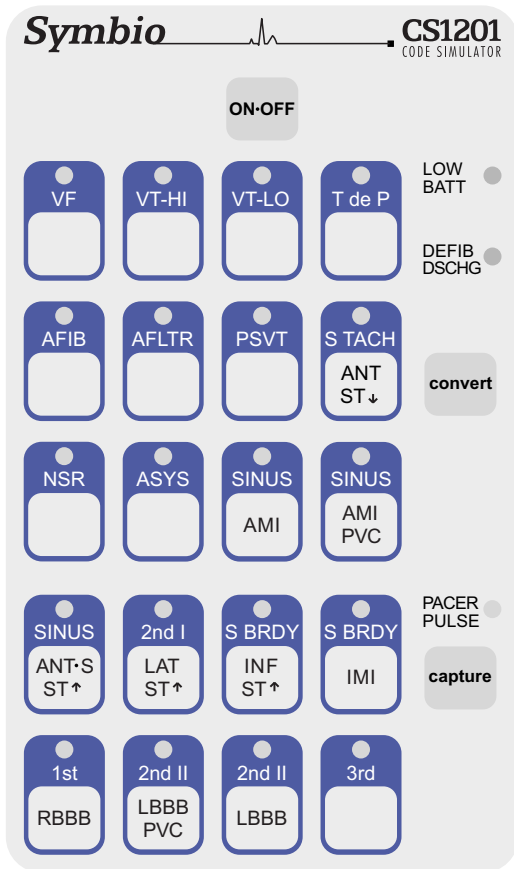
1. Press **convert** key. The indicator of the running rhythm pulses brighter.
2. Press key of the waveform to run after the defib discharge.
3. Deliver discharge from defib set to 50J or more.

The pre-selected rhythm is now the running rhythm.

To cancel a convert operation before its completed, press either the **convert** key or the key of the running rhythm. If a convert operation is started but not completed in two minutes, it will cancel automatically.

capture
When the pacer's current and rate are properly adjusted, paced beats are displayed and the **PACER PULSE** indicator blinks off with each pacer pulse detected.

Press **capture** key to select one of five pacing capture levels: 70, 80, 90 and 100 mA, or "ignore". Brightness of **PACER PULSE** indicates the level selected. At 70 mA, the brightness is lowest. At 100 mA, the brightness is highest. When the **PACER PULSE** indicator is off, "ignore" is selected and the simulator won't respond to pacer pulses. At power-on, the default pacing capture level is 70 mA.



ST Segment and T Wave Abnormalities

SINUS AMI	Sinus rhythm with acute AMI. Q waves in anterior leads. ST elevation. Rate: 72 bpm.
SINUS AMI PVC	Sinus rhythm with acute AMI and PVCs. Q waves in anterior leads. ST elevation. Rate: 72 bpm.
SINUS ANT-S ST↑	Sinus rhythm with Antero-Septal ST elevation. Rate: 72 bpm.
2nd I LAT ST↑	Mobitz type I second degree AV block (4:3) with lateral ST elevation. Rate: varies from 40 to 50 bpm.
S BRDY INF ST↑	Sinus Bradycardia with inferior ST elevation. Rate: 40 bpm.
S BRDY IMI	Sinus Bradycardia with Q waves and ST elevation in II, III and VF. Rate: 40 bpm.

Rhythms for Defibrillator Training

VF	Ventricular Fibrillation
VT-HI	Ventricular Tachycardia - fast. Wide QRS. Rate: 185 bpm
VT-LOW	Ventricular Tachycardia - slow. Wide QRS. Rate: 140 bpm
T de P	Torsades de Pointes. Fluctuating QRS axis.
AFIB	Atrial Fibrillation. P waves absent. Rapid, varying ventricular response. Rate: 154 - 160 bpm
AFLTR	Atrial Flutter. 2:1 AV conduction. Rate: 150 bpm
PSVT	SVT alternates with NSR, then remains in SVT Rate: 213 bpm. PAC falls on T wave. Symmetric T wave inversion.
S TACH ANT ST↓	Sinus Tachycardia with anterior ST depression. Rate: 100 bpm.
NSR	Normal Sinus Rhythm. Rate: 72 bpm.
ASYS	Asystole.

Rhythms for External Pacer Training

1st RBBB	Sinus rhythm with first degree AV block and right bundle branch block. Wide QRS. Rate: 60 bpm.
2nd II LBBB PVC	Mobitz type II second degree AV block (4:3) with left bundle branch block and PVCs. Wide QRS. Rate: varies from 32 to 65 bpm.
2nd II LBBB	Mobitz type II second degree AV block (4:3) with left bundle branch block. Wide QRS. Rate: varies from 37 to 50 bpm.
3rd	Third degree AV block. Q waves in V2 - V4, but normal ST segments. Wide QRS. Atrial rate: 60 bpm. Ventricular rate: 37 bpm.

Defibrillator Exercises

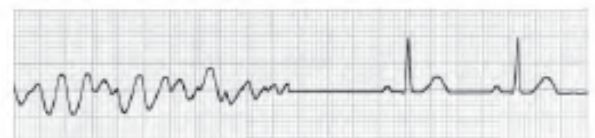
Exercise: Convert VF to NSR.

Connect simulator to defibrillator.
at simulator:

1. Press **VF** key. VF indicator glows steadily. Confirm VF is displayed on monitor.
2. Press **convert** key. VF indicator pulses brighter.
3. Press **NSR** key. NSR indicator flashes on and off. VF indicator glows steadily again.

at defibrillator:

4. Select 200J using **Energy Select** switch (1).
5. Press **Charge** button (2). Listen for charge ready tone.
6. Press **Discharge** button(s) (3).
7. After discharge observe that:
On monitor, NSR is displayed
At simulator, NSR indicator glows steadily, and VF indicator is off.



VF

NSR



External Pacer Exercise

Exercise: Pace 3rd degree AV block at rate of 70 ppm.

Connect simulator to external pacer.

To simulate paced beats, pacer **Rate** must be greater than rate of selected rhythm, and pacer **Output** must be greater than simulator capture level.

at simulator:

1. Press **3rd** key. Confirm 3rd degree AV block is displayed on monitor.
2. Press **capture** key once to select capture level II (75 to 80mA capture level).

at pacer:

3. Select **Pacer On**. Verify sense markers are displayed with each R wave. (If not, press **ECG Size** button until R wave markers are observed.)
4. Select rate of 70 ppm using Rate control.
5. Press **Start/Stop** button to start pacing.
6. Using **Output** control, increase pacer current until paced beats are displayed. Pacer current setting will be 75 to 80 mA.



3rd degree AV block

paced beats at 70ppm

Battery Saver Feature

The CS1201 powers-off automatically 30 minutes after a key was last pressed, or after defib or pacer energy was last detected. This is normal battery saver operation. To enable the simulator to remain powered-on after 30 minutes of inactivity, follow these instructions:

1. With the simulator powered-off, press and hold down **convert** key, then press and release **ON OFF** key.
2. Watch the **NSR** indicator. When it flashes rapidly, release the **convert** key.

IBP (an optional feature)

If your CS1201 has the optional IBP feature, you will need to zero your IBP monitor before displaying IBP waveforms.

1. Start with your IBP monitor powered-off and then connect its IBP cable to the CS1201's IBP cable.
2. Power-on the CS1201 and select **ASYS**.
3. Then, power-on your monitor and follow its instructions for zeroing.

WARNING: Shock Hazard Exists

When discharging the defibrillator, keep hands and all objects clear of the simulator. Be sure the simulator cable or ECG cable is securely plugged into the defibrillator. Be sure that the simulator housing is intact, and that the cable is free of nicks, cracks and cuts. Do not discharge the defibrillator into the simulator more than three times within one minute. Never discharge more than 360 joules into the simulator. Do not immerse or set the simulator in liquid. Using the device in standing water can present a shock hazard to the operator and anyone nearby.

Maintenance and Calibration

Based on the product's design, and based on experience with units in the field, Symbio does not recommend regular calibration of our Simulators. From a design standpoint, the time base used to generate ECG waveforms and to measure the duration of defib and pacer pulses is crystal-controlled; therefore, ECG waveform rates and defib/pacer measurement criteria remain constant over time.

Warranty and Service

The CS1201 ECG Simulator is warrantied to be free of defects in material or workmanship for three years from date of purchase. If your simulator needs service, or if you have questions about its operation, please contact Symbio Corporation.

NOTE: Damaged caused by battery acid corrosion is not covered by the warranty. Removing the batteries between uses is recommended.

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