Temporary Pacemaker Intended Use

• Used with a cardiac pacing lead system for temporary single or dual chamber pacing in a clinical environment by trained personnel.

• Used where short-term demand (synchronous) or asynchronous pacing is indicated for therapeutic, prophylactic, or diagnostic purposes.

• Must be used in an environment where the patient is monitored continuously to ensure that it is operating properly and delivering appropriate therapy to the patient.
Current Medtronic Temporary Pacemakers

Provides temporary stimulation for arrhythmia and cardiac conduction disorders, bradycardia after cardiac surgery, and pacemaker implant or replacement procedures.

**Medtronic 5388 EPG**
Medtronic’s Dual Chamber External Pacemaker

**Medtronic 5348 EPG**
Medtronic’s Single Chamber External Pacemaker
Side-by-Side Comparison of Model 5388 vs. Model 5392
Overview

1. DOO/Emergency key
2. On/Off key
3. Pacing and sensing status bar indicators
4. Rate dial
5. A (Atrial) Output dial
6. V (Ventricular) Output dial
7. Lock/Unlock key
8. Enter key
9. Selection indicator
10. Up/Down arrow keys
11. Menu Parameter dial
12. Pause key
13. Lower screen
14. Lock indicator
15. Pacing Mode indicator
16. Battery indicator
17. V (Ventricular) Output scale
18. A (Atrial) Output scale
19. Rate scale
20. Upper screen
Basic Functionality

Objective

How to program appropriate settings on the device to correct a sensing or capture issues

• NBG code
• Pacing Setup Table
• Troubleshooting Process
  – Review sensing/output issues
### NBG Codes

<table>
<thead>
<tr>
<th>1st Letter</th>
<th>2nd Letter</th>
<th>3rd Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamber(s) Paced</td>
<td>Chamber(s) Sensed</td>
<td>Response to Sensing</td>
</tr>
<tr>
<td>A = atrium</td>
<td>A = atrium</td>
<td>I = inhibit</td>
</tr>
<tr>
<td>V = ventricle</td>
<td>V = ventricle</td>
<td>(Demand mode)</td>
</tr>
<tr>
<td>D = dual (both atrium and ventricle)</td>
<td>D = dual</td>
<td>T = triggered</td>
</tr>
<tr>
<td></td>
<td>O = none</td>
<td>D = dual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O = none (Asynch)</td>
</tr>
</tbody>
</table>

- **Chamber paced**
- **Chamber sensed**
- **Action or response to a sensed event**

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Model 5392
DUAL-CHAMBER TEMPORARY EXTERNAL PACemaker

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# Pacing Setup Table

<table>
<thead>
<tr>
<th>Setup Indicators</th>
<th>AOO</th>
<th>VOO</th>
<th>AAI</th>
<th>VVI</th>
<th>DOO</th>
<th>DDD</th>
<th>DDI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Set Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Output</td>
<td>On</td>
<td>Off</td>
<td>On</td>
<td>Off</td>
<td>On</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>V Output</td>
<td>Off</td>
<td>On</td>
<td>Off</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>2. Set Sensitivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Sensitivity</td>
<td>ASYNC</td>
<td>NA</td>
<td>On</td>
<td>NA</td>
<td>ASYNC</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>V Sensitivity</td>
<td>NA</td>
<td>ASYNC</td>
<td>NA</td>
<td>On</td>
<td>ASYNC</td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>3. Set</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Tracking</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>On</td>
<td>Off</td>
</tr>
</tbody>
</table>

**Note:**
- A: PACE SENSE
- V: PACE SENSE
- A/V: PACE SENSE
- A+V: PACE SENSE

**Model 5392**

**Medtronic**

**Dual Chamber Temporary External Pacemaker**
Troubleshooting Process

1. Gather Information
2. Identify the Problem and Possible Cause
3. Identify the Solution and Carry Out Corrective Procedures
Scenario #1

Gather Information and Identify the Problem

Electrical stimuli delivered by the pacemaker does not initiate depolarization of the ventricle
Scenario #1

Identify the Problem and Solution

Possible Causes
• Threshold rise
• Fractured/dislodged lead
• Battery depletion
• QRS not visible
• Tissue is refractory
• Faulty cable connections

Corrective Measures
• Increase output (mA)/check thresholds
• Replace/reposition lead
• Replace battery
• Adjust ECG
• Assess mode selection
• Check connections
• Switch polarity (epicardial system)
Scenario #1

Carry Out Corrective Procedures

Increase Output

Increase OUTPUT: Slowly turn the output dial clockwise until ECG shows consistent capture.

Perform Stimulation Threshold

1. Set RATE at least 10 ppm above patient’s intrinsic rate.
2. Decrease OUTPUT
3. Increase OUTPUT
4. Set OUTPUT
5. Restore RATE to previous value.

Increase RATE, Decrease A OUTPUT or V OUTPUT
Scenario #2

Gather Information and Identify the Problem

Pacemaker fails to emit stimuli at the programmed intervals
Scenario #2

Identify the Problem and Solution

Possible Causes
- Battery depletion
- Pacemaker OFF
- Faulty cable connections
- Fractured/dislodged lead
- Oversensing

Corrective Measures
- Replace battery
- Verify pacemaker settings
- Check cable connections
- Replace/reposition lead
- Verify/adjust sensitivity
Scenario #2

Carry Out Corrective Procedures

With Device Actively Pacing the Patient

1. Lock the Device before replacing the batteries
2. Confirm message in lower screen.

To install or replace batteries:

1. Press the battery drawer latch release button.
2. Remove the old batteries.
3. Install two new LR6-sized (AA-sized) alkaline batteries.
4. Close the battery drawer.
5. Discard the old batteries properly.

Medtronic does not recommend replacing the batteries while the temporary pacemaker is turned on or actively pacing the patient. However, if during an emergency situation the batteries must be replaced while the temporary pacemaker is in use, ensure that the temporary pacemaker is locked before replacing the batteries. Pacing is maintained for 30 s, minimum, at 80 min⁻¹ (ppm), and nominal outputs.

Model 5392
DUAL-CHAMBER TEMPORARY EXTERNAL PACEMAKER
Scenario #3

Gather Information and Identify the Problem

Failure of the pacemaker to sense intrinsic R waves
Scenario #3

Identify the Problem and Solution

Possible Causes
• Decreased QRS voltage
• Fractured/dislodged lead
• Battery depletion
• Inappropriate sensitivity setting
• Fusion beat

Corrective Measures
Increase sensitivity
• Replace/reposition Lead
• Replace Battery
• Sensing test/increase sensitivity
Scenario #3

Carry Out Corrective Procedures

Sensing Threshold
1. Set RATE below patient’s intrinsic rate.
2. Decrease output
3. Navigate and Decrease sensitivity
4. Increase sensitivity
5. Set sensitivity
6. Restore RATE and OUTPUT to previous values.

Caution: Monitor patient’s ECG and blood pressure during procedure. Determine sensing threshold before stimulation threshold to reduce risk of competitive pacing.
Brief Statement: Model 5392 Dual-Chamber Temporary Pacemaker

Intended Use
The Medtronic Model 5392 dual-chamber temporary pacemaker is intended to be used in conjunction with a cardiac pacing lead system for temporary single or dual chamber pacing in a clinical environment by trained personnel. The temporary pacemaker can be used where short-term demand (synchronous) or asynchronous pacing is indicated for therapeutic, prophylactic or diagnostic purposes. The temporary pacemaker must be used in an environment where the patient is monitored continuously to ensure that it is operating properly and delivering appropriate therapy to the patient.

Contraindications
There are no known contraindications to the use of temporary pacing as a means to control the heart rate. The patient’s age and medical condition, however, may dictate the type of temporary pacemaker and lead system used by the physician. Pacing modes which allow sensing in the atrium to trigger a ventricular response are contraindicated in the presence of rapid atrial arrhythmias such as atrial fibrillation or atrial flutter. Atrial pacing is ineffective in the presence of atrial fibrillation or flutter. Single chamber atrial pacing is contraindicated in the presence of AV conduction disorders. Asynchronous pacing is contraindicated in the presence of intrinsic cardiac rhythms. Atrial high-rate burst pacing therapy is intended for use in the atrium only. High-rate burst pacing in the ventricle may result in life-threatening arrhythmias. The temporary pacemaker is MR Unsafe.
Brief Statement: Model 5392
Dual-Chamber Temporary Pacemaker

Warnings/Precautions
Monitor the patient continuously while the temporary pacemaker is in use to ensure it is operating properly and delivering appropriate therapy to the patient. ECG monitoring should be in use and defibrillating equipment should be placed on standby and be kept immediately available during pacing lead insertion, pulse generator connection and adjustment, measurements of stimulation thresholds or sensed potentials, and application of antitachycardia burst therapy. Use of high rates in the atrium may result in accidental conduction to the ventricle. Defibrillation equipment should be kept immediately available during high-rate pacing.

Operational failure of the temporary pacemaker can occur as the result of battery depletion, mishandling, or random component failure. Complications related to the use of temporary external pacemakers such as the Model 5392 include, but are not limited to asystole following abrupt cessation of pacing, inhibition, and reversion. Potential complications related to the use of pacing lead systems with the Model 5392 include, but are not limited to myocardial irritability resulting in fibrillation, infarction, pericarditis, rejection, muscle and never stimulation, and infection. Complication related to inhibition or reversion of the pacemaker in the presence of strong electromagnetic interference.

Whenever possible, for the safety of the patient, disconnect the temporary pacemaker from the implanted lead system before defibrillating or cardioverting. Excessive defibrillation energy can damage the temporary pacemaker. This can result in a large current flowing through the implanted lead system and temporary pacemaker, which could reduce intended defibrillation energy delivered to the patient or cause myocardial damage.

A lead with extension cable constitutes a direct, low-resistance current path to the myocardium. During connection and testing procedures, only battery-powered instrumentation should be used. Extreme caution must be taken to properly ground all line-powered equipment used in the vicinity of the patient. Electrosurgical units can cause tachyarrhythmias by inducing current on the leads.

Improper connection, displacement or fracture of leads or cables may result in pacemaker system failure. Inspect leads and cables for damage before each use. The pacing lead system may cease to function at any time due to improper connections or lead-related problems such as displacement or fracture.

Do not modify the temporary pacemaker. Modifications could impact the temporary pacemaker effectiveness and adversely affect patient safety.

See the device manual for detailed information regarding the procedure, indications, contraindications, warnings, precautions, and potential complications/adverse events. For further information, please call Medtronic at 1-800-328-2518 and/or consult Medtronic’s website at www.medtronic.com.

Caution: Federal law (USA) restricts this device to sale by or on the order of a physician.
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Technical manuals:
www.medtronic.com/manuals
References

1. Medtronic 5392 Dual Chamber Temporary Pacemaker Technical Manual

http://manuals.medtronic.com/