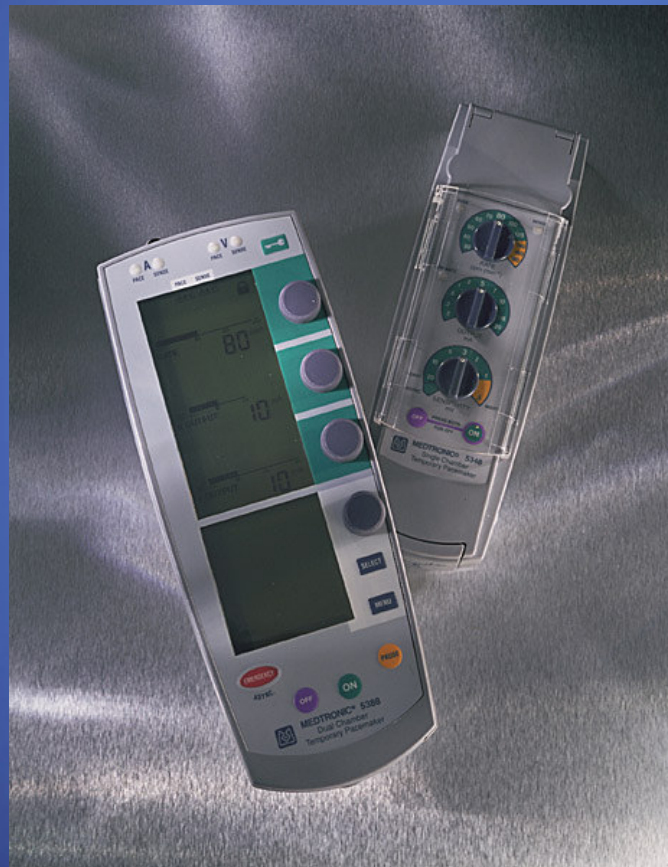# Temporary Pacemakers

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June 2007

Model 5388 Dual Chamber Temporary Pacemaker

1. Pace/Sense LEDs
2. Lock/Unlock Key
3. Lock Indicators
4. Rate Dial
5. Atrial Output Dial
6. Ventricular Output Dial
7. Menu Parameter Dial
8. Parameter Selection Key
9. Menu Selection Key
10. Pause Key
11. Power On Key
12. Power Off Key
13. Emergency/Asynchronous Pacing Key
14. Lower Screen
15. Ventricular Output Graphics
16. Atrial Output Graphics
17. Upper Screen
18. Rate Graphics
19. Setup Indicators
20. DDI Indicator
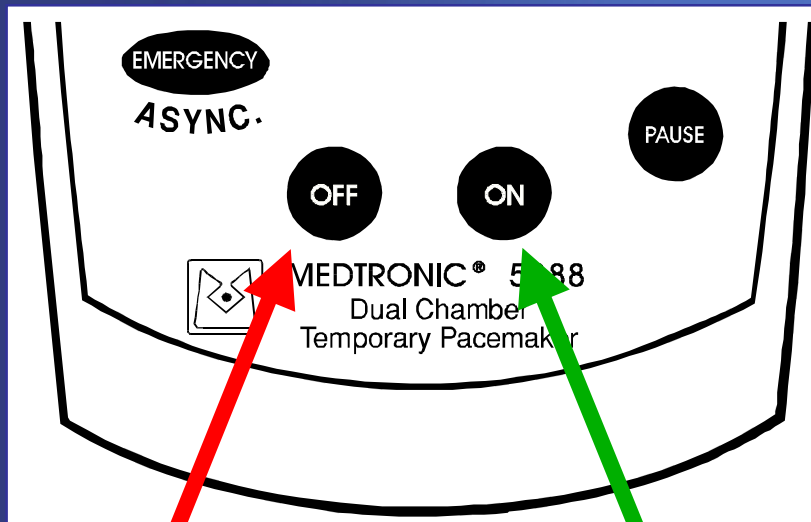21. Low Battery Indicator
22. Setup Labels
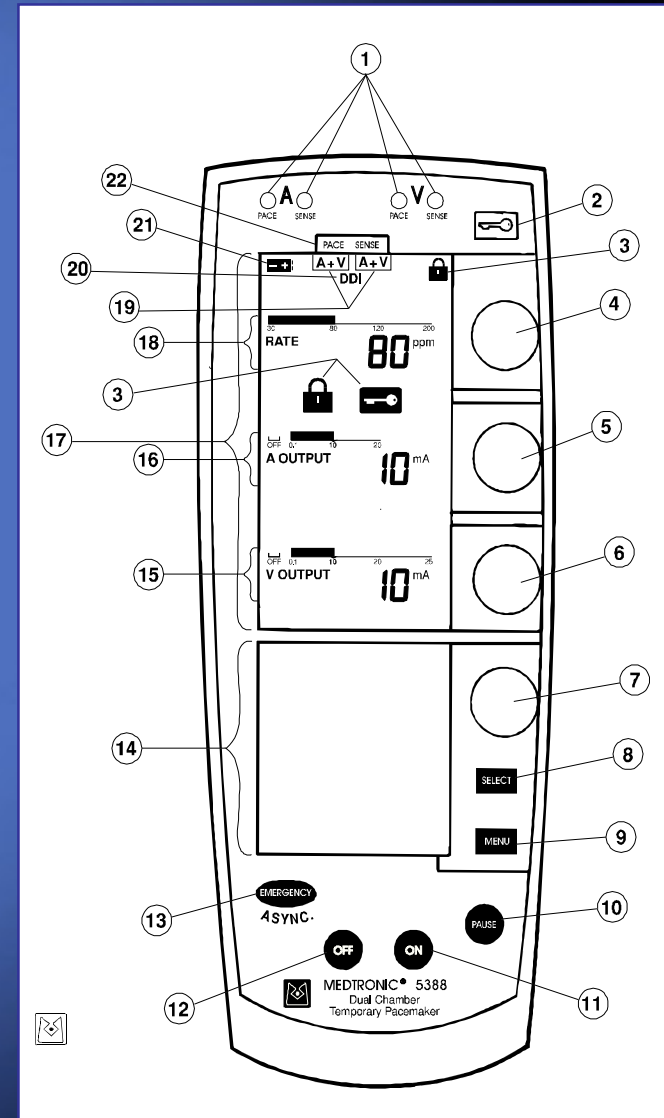
Off / On Keys

Values at Power-On

Dual Chamber Pace/Sense
- **RATE**   **80 ppm**
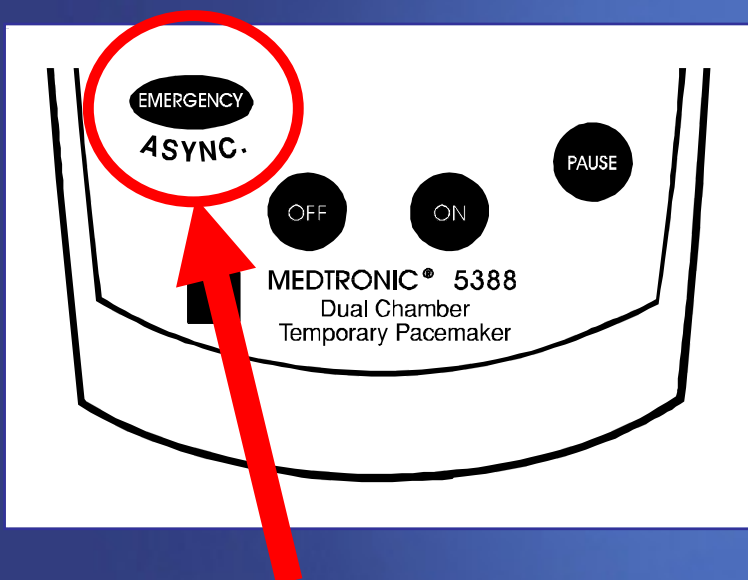- UPPER RATE   110 ppm

OFF   **ON**   Push once

Push twice

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Emergency Key

Emergency Pacing Values

- RATE   Current Rate
- A OUTPUT   MAX
- V OUTPUT   MAX
- PACING   ASYNC
- NO SENSING!

EMERGENCY
ASYNC.

PAUSE

OFF

ON

MEDTRONIC® 5388
Dual Chamber
Temporary Pacemaker

Always available – Single key press enters Emergency mode
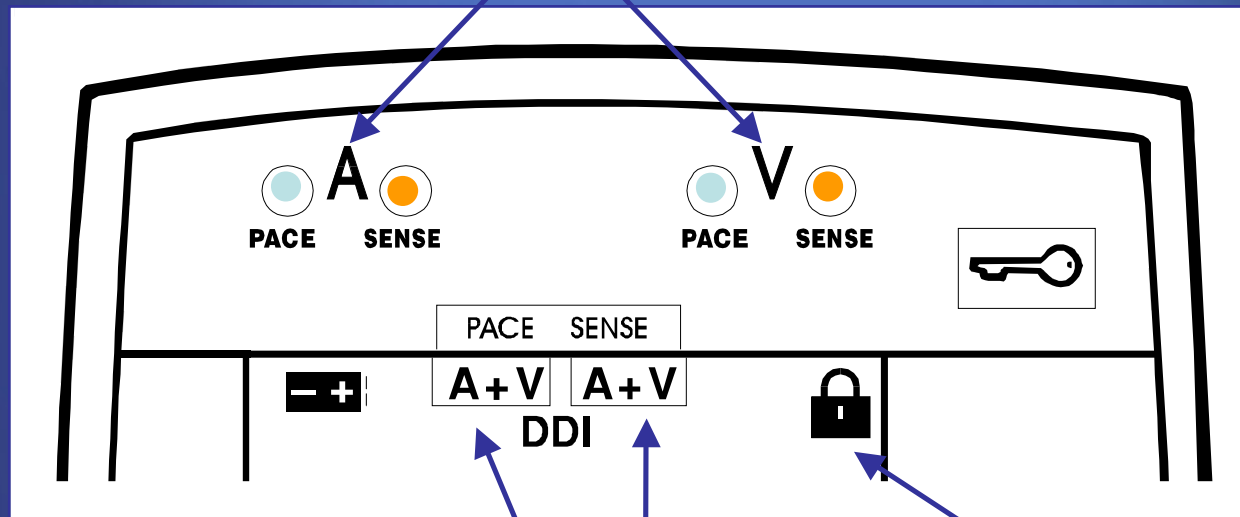
Use caution when setting the device to asynchronous modes.

Pause Key – Check Patient's Intrinsic Rhythm

EMERGENCY

ASYNC.

OFF

ON

PAUSE

MEDTRONIC® 5388
Dual Chamber
Temporary Pacemaker

10 seconds max
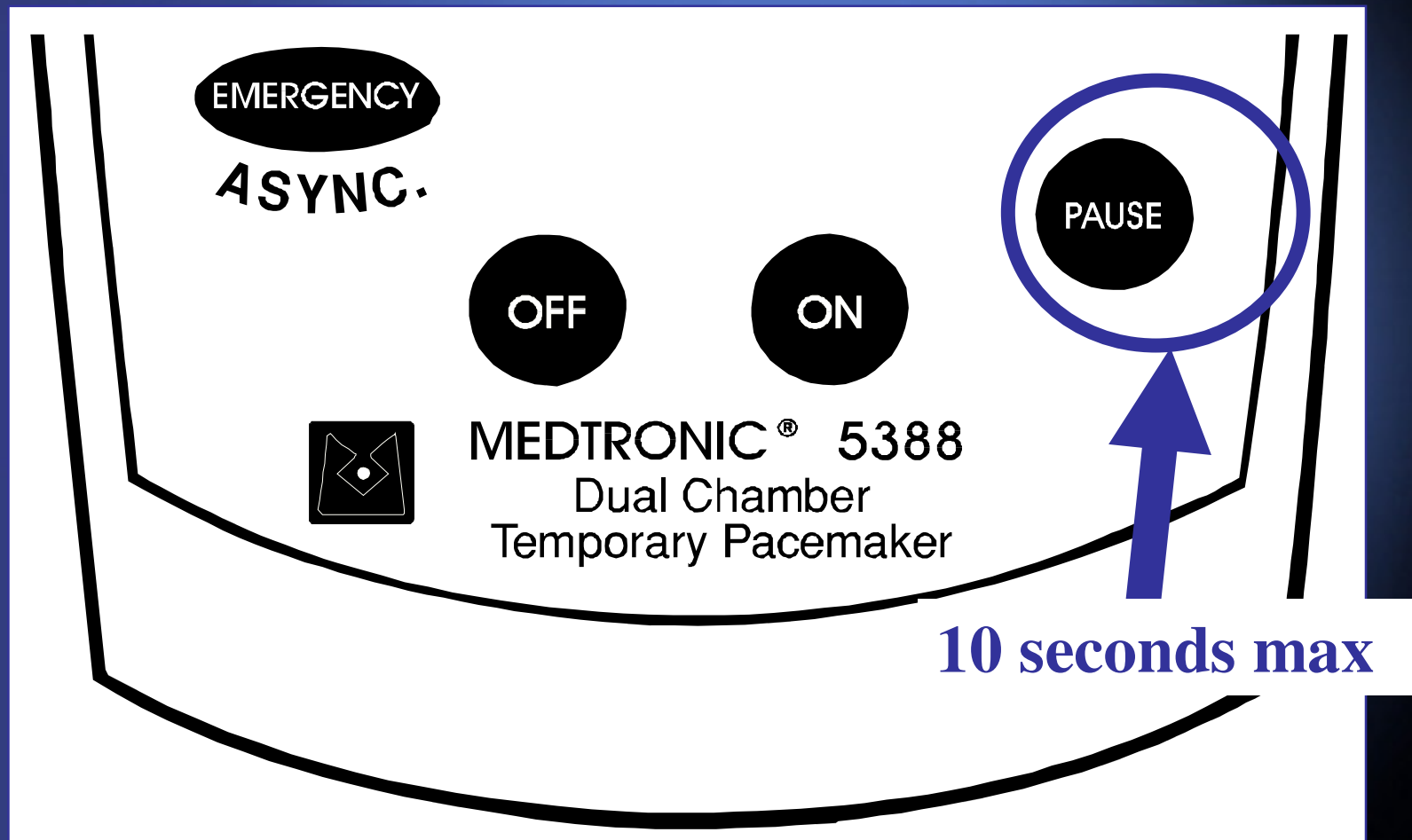
Indicators

Pace/Sense Indicators
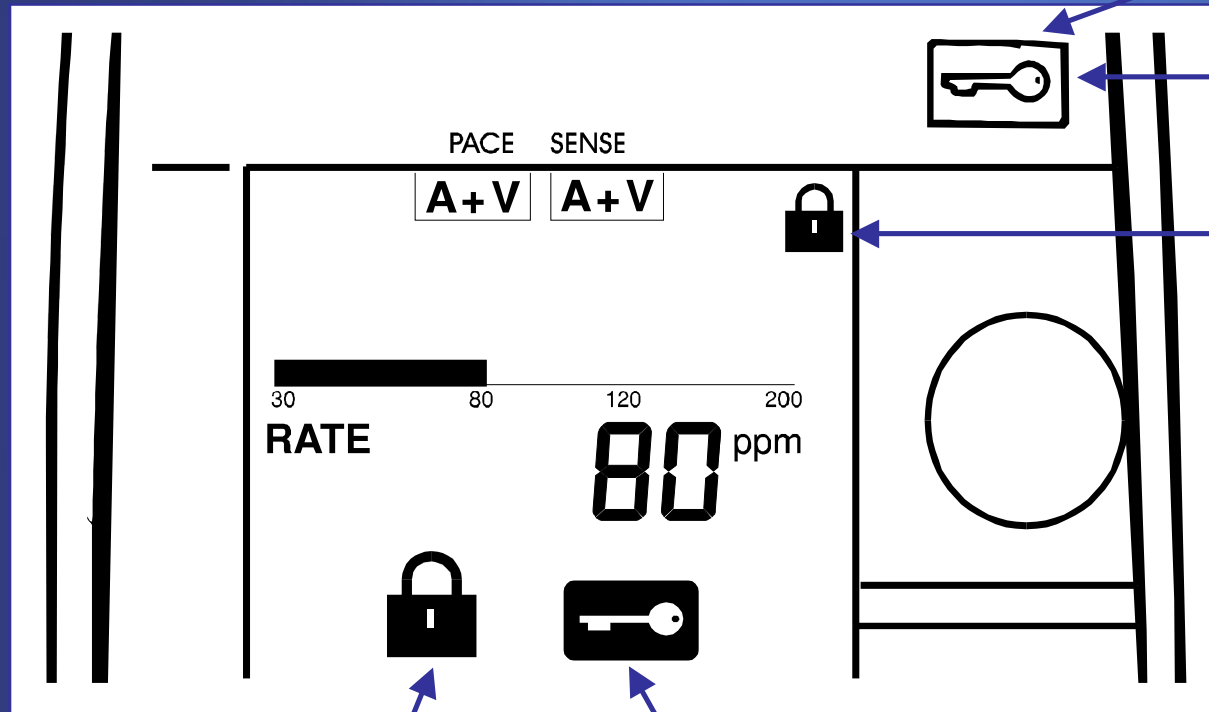**(Flashing Lights)**

Pace/Sense
Setup Indicators
("how is the device setup?")

Padlock
Indicator
("is the device
locked?")

Lock / Unlock

Locks Rate, V Output, A Output dials

Lock/Unlock Key

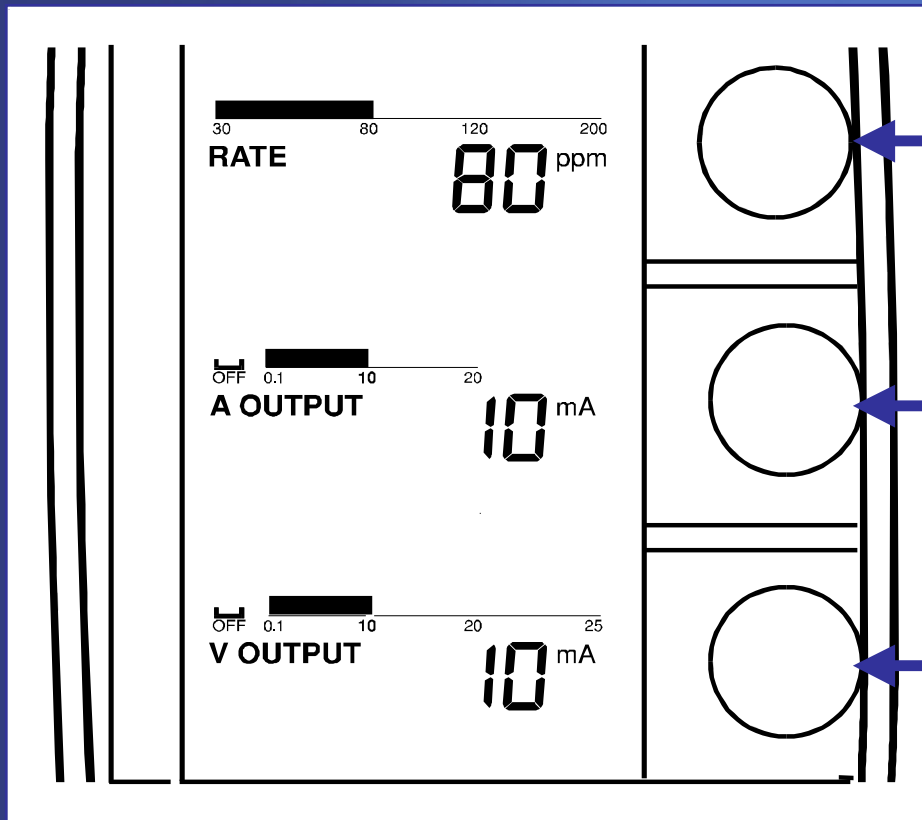Lock Indicator

Padlock Icon

Flashing Key Icon

PACE   SENSE

A + V   A + V

30   80   120   200
RATE   80 ppm

To unlock push the "Lock/Unlock" Key

Emergency key is always available

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Rate and Output Adjustments
Single or Dual Chamber Pacing With Only 3 Dials!

30   80   120   200

RATE   **80** ppm

OFF   0.1   10   20

A OUTPUT   **10** mA

OFF   0.1   10   20   25

V OUTPUT   **10** mA

Rate Dial

Max rate of **200bpm** for pediatrics

Atrial Output Dial

For Single Chamber pacing, turn OFF Atrial output

Ventricular Output Dial

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Lower Screen Menus

Menu 1: Pacing Parameters

Menu 2: Rate-Based Pacing Parameters

Menu 3: Rapid Atrial Pacing

Menu M: Dial-A-Mode

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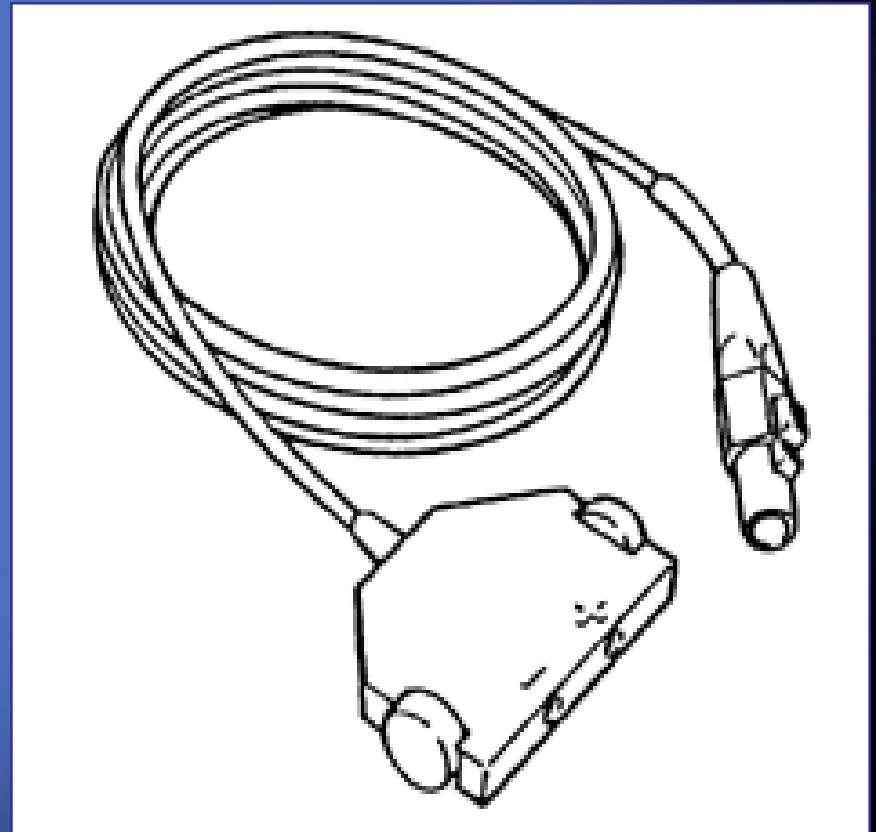June 2007
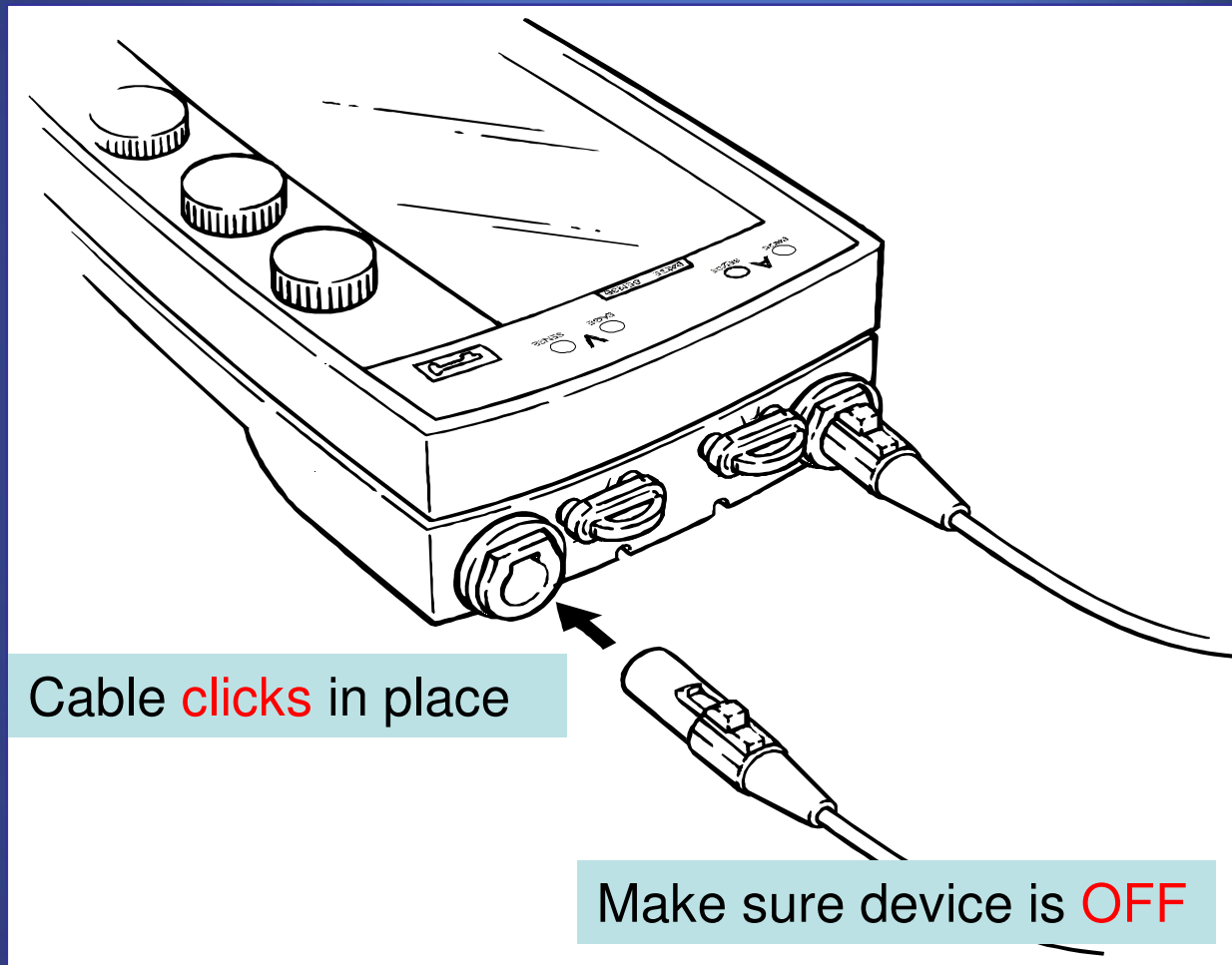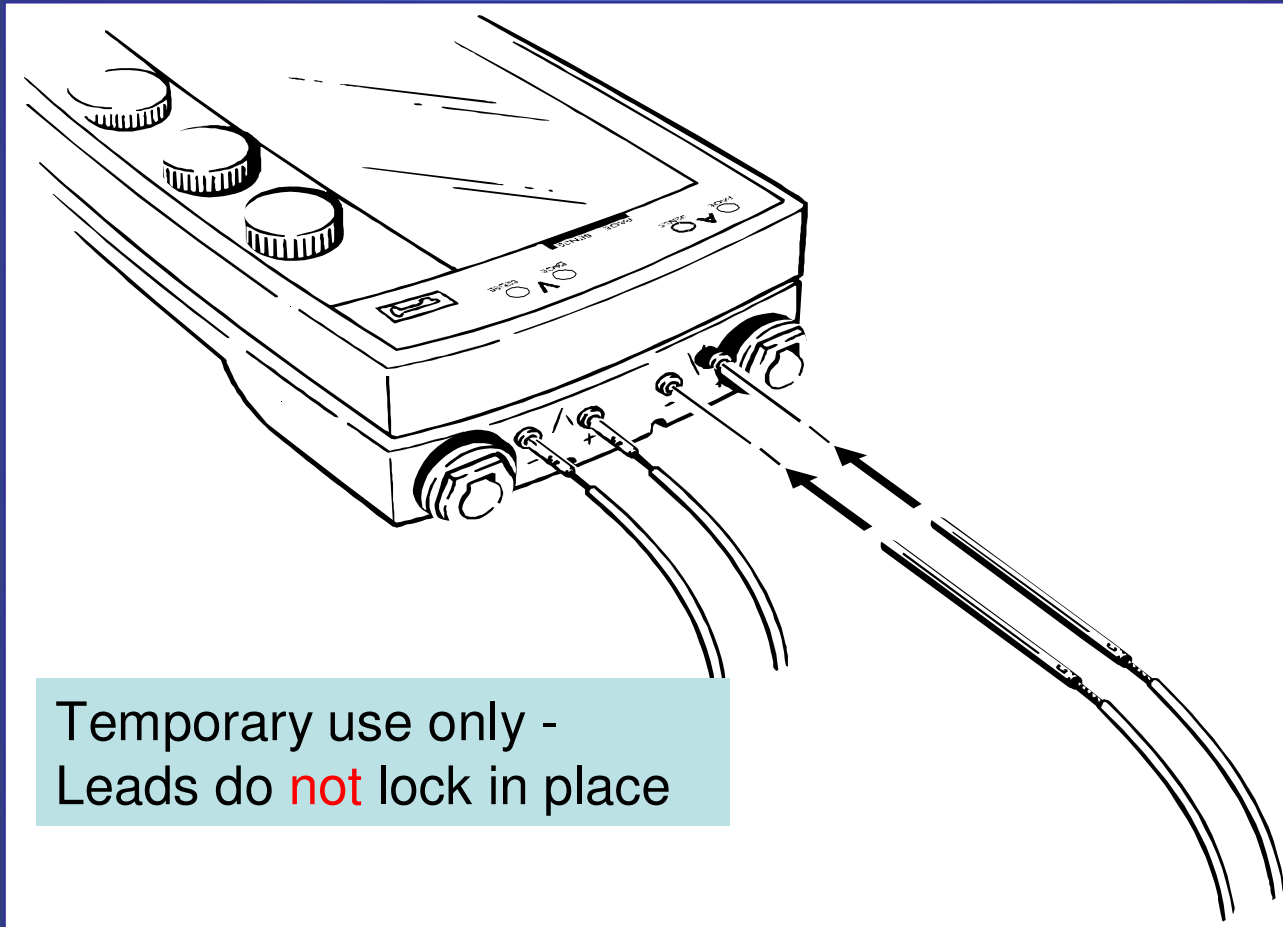
Device Usage - Cable Connectors

- Connector pins on the lead(s) must be fully inserted in the patient connector block

- Observe polarity

- **Finger tighten only** – no tools!

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Cable to Device Connections

Cable clicks in place

Make sure device is OFF

Emergency Connections

Temporary use only -
Leads do not lock in place

Battery Operation
Replace the battery for each new patient

Low Battery Indicator
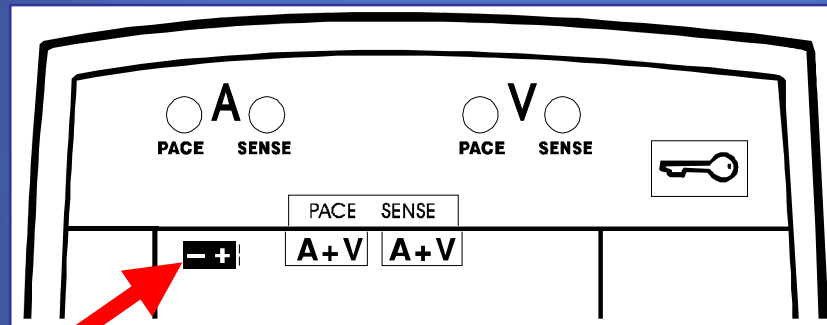
Low Battery Indicator
When indicator first appears you have approximately **24 hours** of pacing remaining

Check Status
Check battery status at least twice per day – replace battery when indicator is on

Replace battery at least once per week when device is in continuous use

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Battery Replacement

Make sure the drawer clicks shut

15 seconds of pacing provided
while changing 9V battery
(note: battery polarity is reversible)

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Pacing Setup Table

Model 5388 Pacing Setup Table

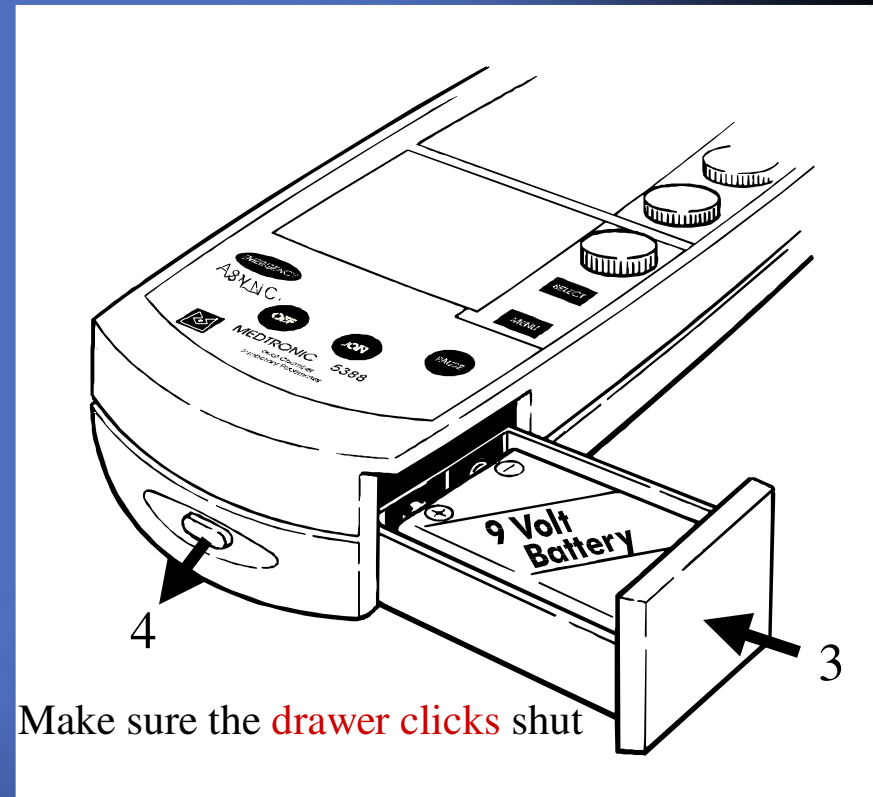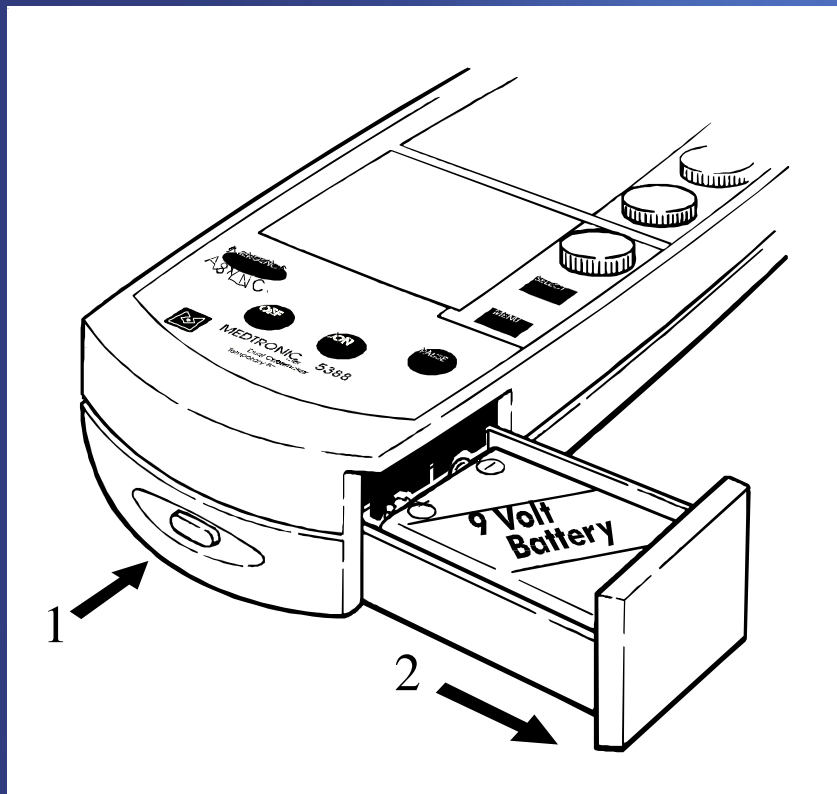| Setup Indicators	AOO*		VOO		AAI		VVI		DOO		DVI		DDD		DDI	
	PACE	SENSE	PACE	SENSE	PACE	SENSE	PACE	SENSE	PACE	SENSE	PACE	SENSE	PACE	SENSE	PACE	SENSE
	A		V		A	A	V	V	A+V		A+V	V	A+V	A+V	A+V	A+V
Instructions																
1. Set Output																
A Output	On		Off		On		Off		On		On		On		On	
V Output	Off		On		Off		On		On		On		On		On	
2. Set Sensitivity																
A Sensitivity	ASYNC		NA		On		NA		ASYNC		ASYNC		On		On	
V Sensitivity	NA		ASYNC		NA		On		ASYNC		On		On		On	
3. Set																
A Tracking	NA		NA		NA		NA		NA		NA		On		Off	

*Caution: DAD and OOO are accessible modes, but are not recommended.
Refer to "Controls, Indicators, and Other Features" in the technical manual.

NA: Not Applicable

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NBG Codes

1st Letter
Chamber(s) Paced

A = atrium

V = ventricle

D = dual (both atrium and ventricle)

2nd Letter
Chamber(s) Sensed

A = atrium

V = ventricle

D = dual

O = none

3rd Letter
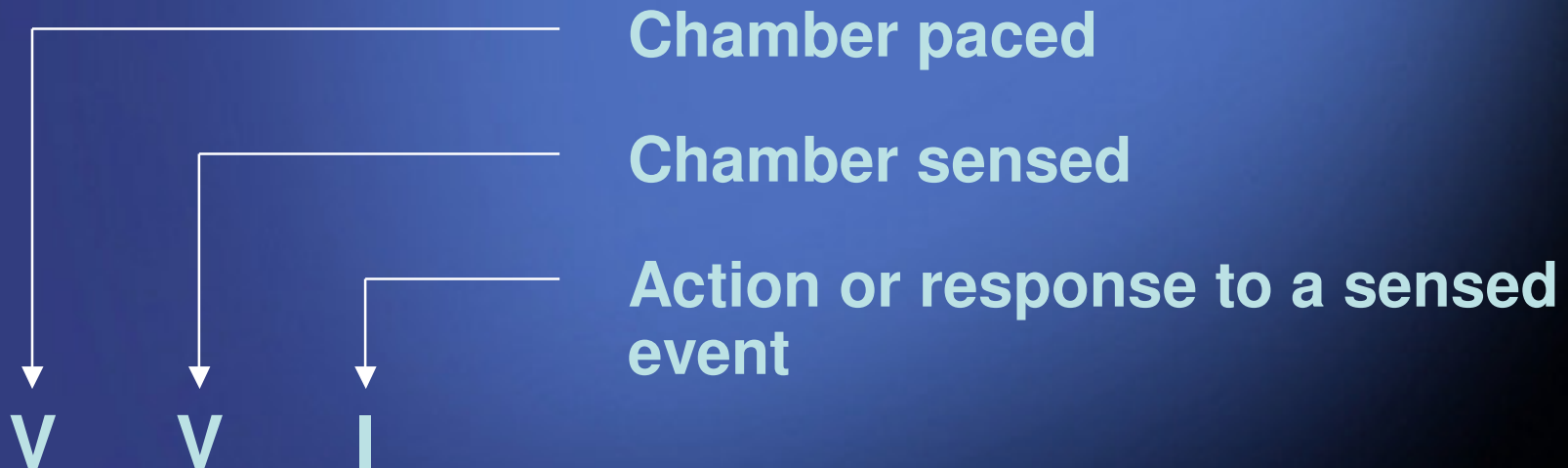### Response to Sensing

I = inhibit (Demand mode)

T = triggered

D = dual

O = none (Asynch)

Chamber paced

Chamber sensed

Action or response to a sensed event

V   V   I

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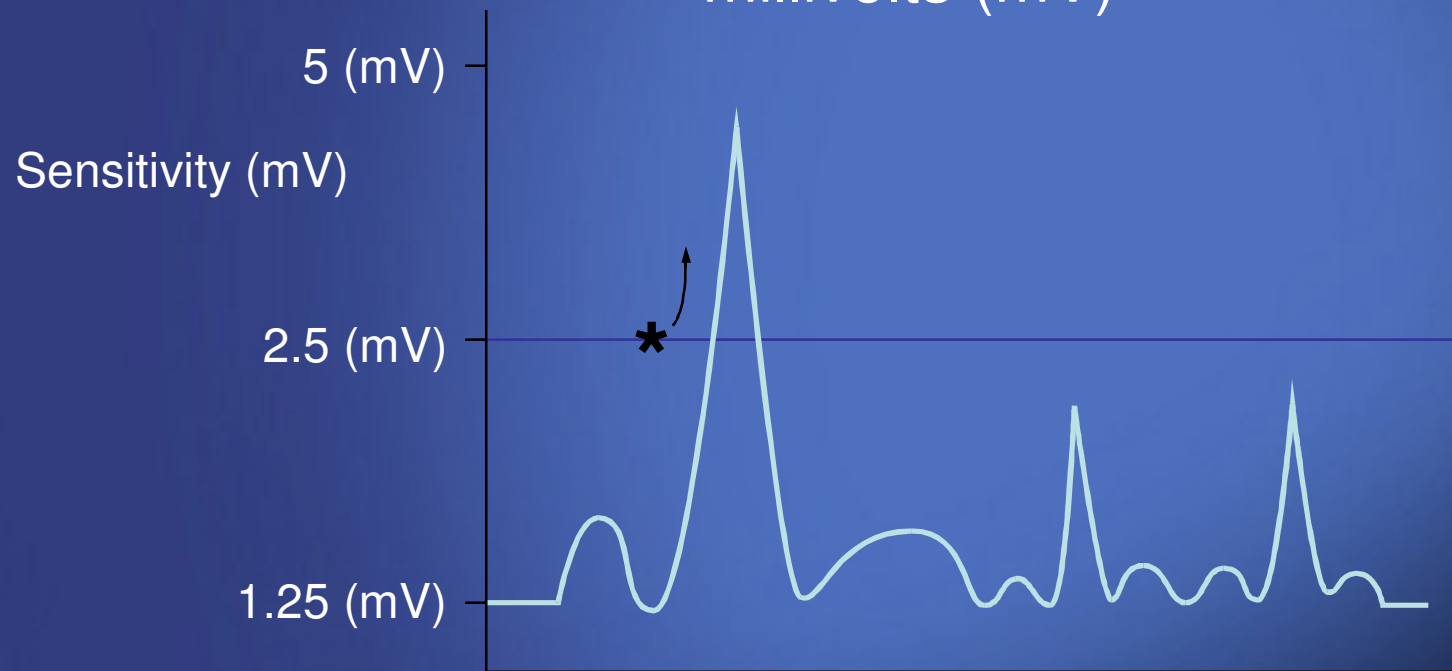June 2007

Setting Sensitivity

The degree that the pacing system "sees" or senses signals, controlled by the sensitivity setting which is graduated in millivolts (mV)

5 (mV)

Sensitivity (mV)

2.5 (mV)

*

1.25 (mV)

Sensitivity settings should provide at least a 2:1 safety margin

Sensing Threshold Procedure

1. Set rate at least 10 ppm _below_ patient's intrinsic rate.

2. Adjust output: Set OUTPUT to 0.1 mA (A OUTPUT for atrial threshold; V OUTPUT for ventricular threshold).

3. Highlight SENSITIVITY (atrial or ventricular) (Menu 1).

4. Decrease SENSITIVITY: Slowly turn **MENU PARAMETER** dial counterclockwise until pace indicator flashes continuously.

5. Increase SENSITIVITY: Slowly turn **MENU PARAMETER** dial clockwise until sense indicator flashes and pace indicator stops flashing. _This value is the sensing threshold._

6. Set SENSITIVITY to half (or less) the threshold value. _This provides at least a 2:1 safety margin._

7. Restore RATE and OUTPUT to previous values.

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Atrial/Ventricular Sensing Thresholds

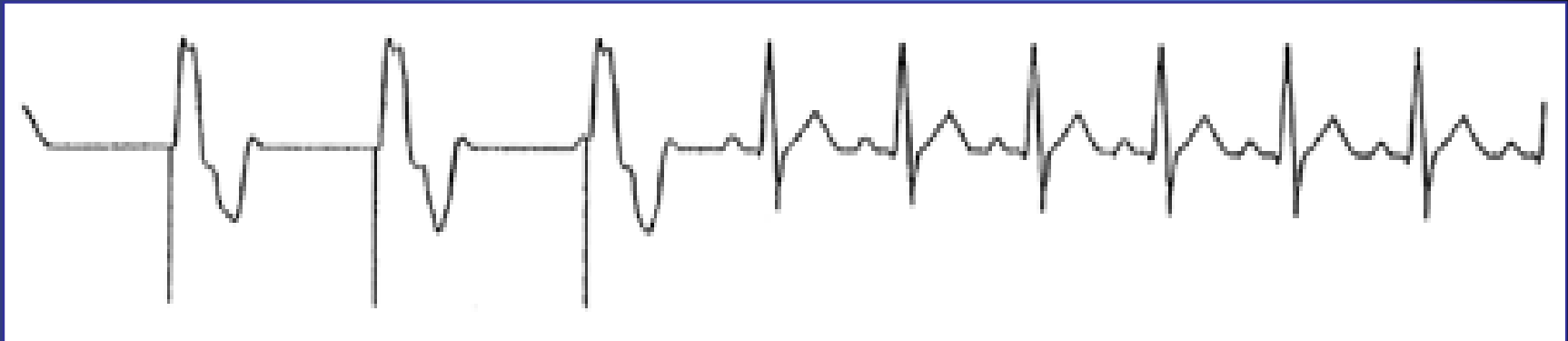## Sensing

Atrial Undersensing

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Capture

Depolarization of cardiac muscle
following an electrical stimulus

Stimulation Threshold

The minimum output pulse needed
to consistently capture the heart

3 mA   2 mA   1 mA

Set output to 2-3 times stimulation threshold

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Stimulation Threshold Procedure

1. Set RATE at least 10 ppm _above_ patient's intrinsic rate.

2. Decrease OUTPUT: Slowly turn **OUTPUT** dial counterclockwise until ECG shows loss of capture.

3. Increase OUTPUT: Slowly turn **OUTPUT** dial clockwise until ECG shows consistent capture.
   This value is the stimulation threshold.

4. Set OUTPUT to a value 2 to 3 _times greater_ than the stimulation threshold value.
   This provides at least a 2:1 safety margin.
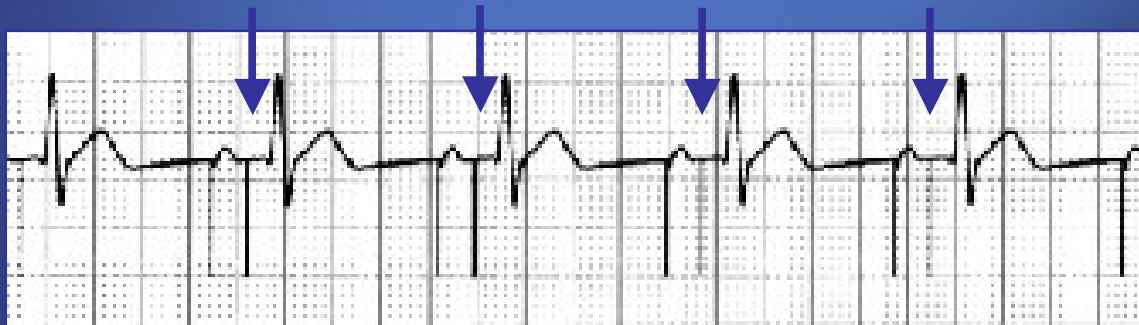
5. Restore RATE to previous value.

Atrial/Ventricular Stimulation Thresholds
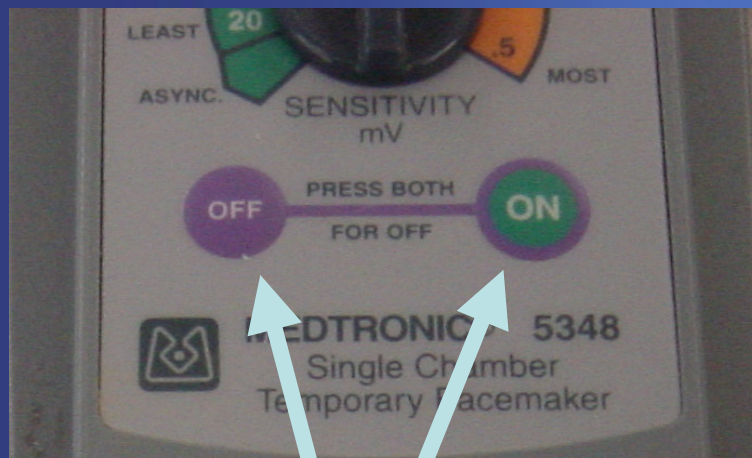
Capture

Loss of Ventricular Capture

Model 5348 Single Chamber Pacemaker

Basic Device Operation

Turning device off

**Push both buttons at the
same time to turn OFF**

Battery Replacement

Push
Buttons at
the same
time

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Locking Feature and Emergency

Locking Feature

Slide plastic cover over dials to protect against changes in settings

Emergency Pacing

- Rate   Check Rate
- Output   Turn to MAX
- Sensitivity   Turn to ASYNC

  Use caution when setting the sensitivity to asynchronous

MAX output

Asynch.

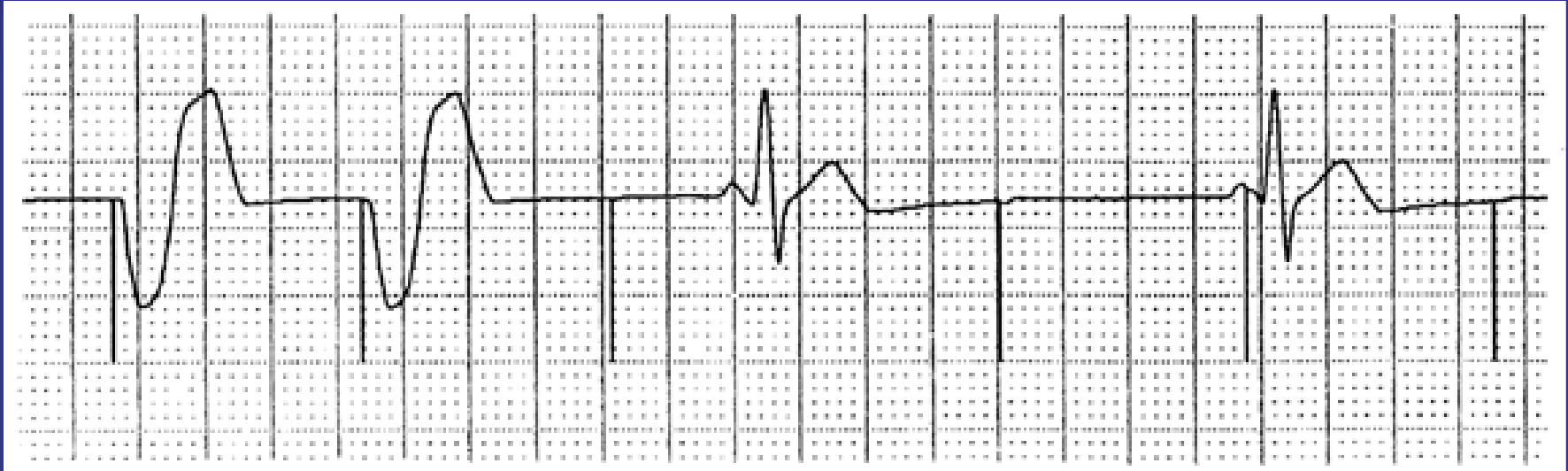# Troubleshooting Pacemaker Performance

Troubleshooting Process

1. Gather information

2. Identify the problem and possible cause

3. Identify the solution and carry out corrective procedures

Loss of Capture

Electrical stimuli delivered by the pacemaker does not initiate depolarization of the atria or ventricle

Loss of Capture

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
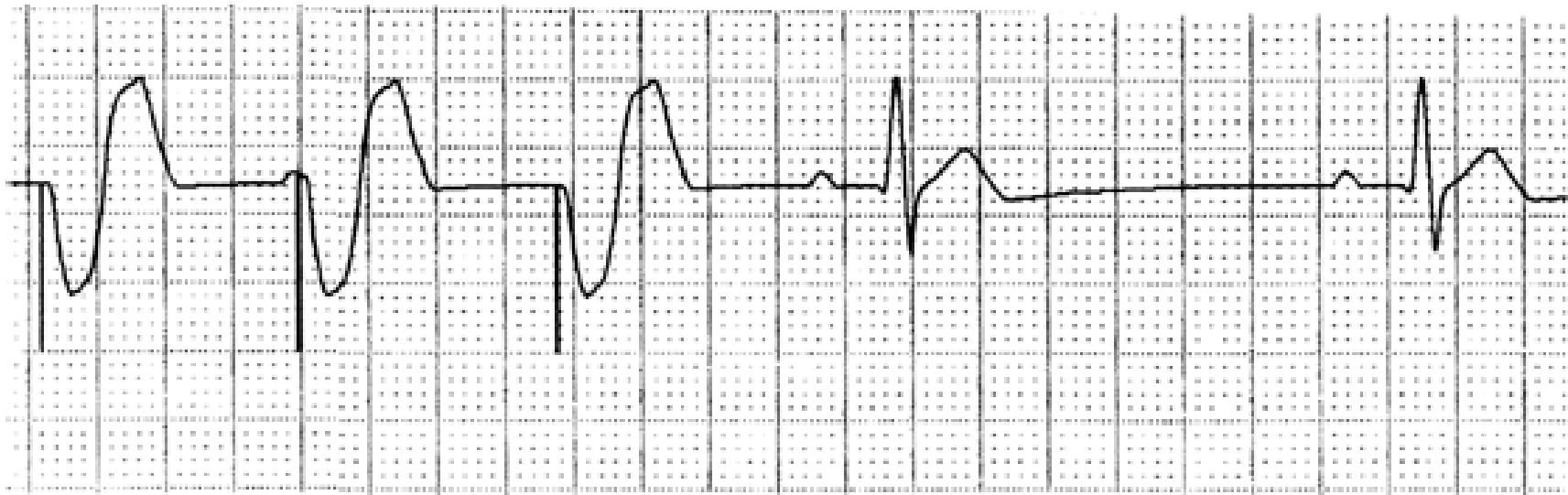- Check connections
- Switch polarity (epicardial system)

No Output

Pacemaker fails to emit stimuli at the programmed intervals

No Output

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
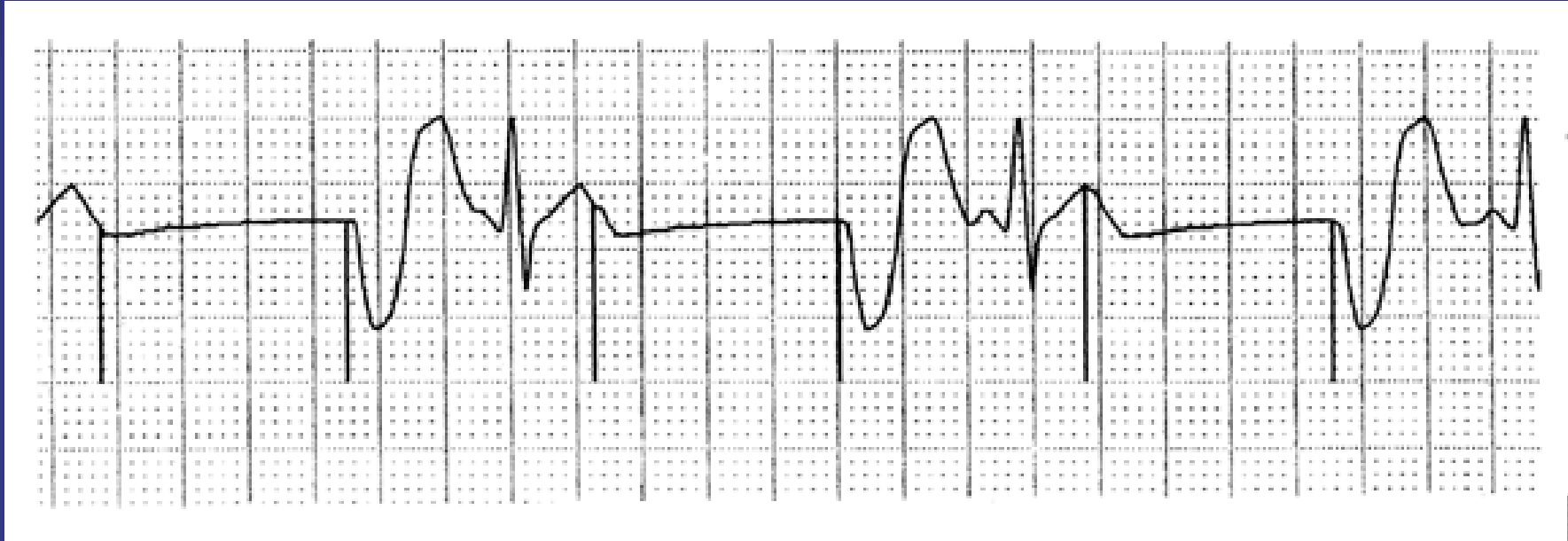- Verify/adjust sensitivity

Undersensing

Failure of the pacemaker to sense
intrinsic R-waves or intrinsic
P-waves

Undersensing

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

Fusion/Pseudofusion Beats

Intrinsic Beat   Paced Beat

Fusion Beat   Pseudofusion Beat

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Oversensing

Inhibition of the pacemaker by events
pacemaker should ignore, e.g. EMI,
T-waves and myopotentials

Oversensing

Possible Causes
- Fractured/dislodged lead
- Environmental interference
- T-wave oversensing
- Faulty cable connections

Corrective Measures
- Replace/reposition lead
- Eliminate interference
- Sensing test/decrease sensitivity
- Check connections

References

- Dubin D. Rapid Interpretation of ECGS. 6th ed. Tampa: Cover, Inc; 2000.

- Ellenbogen KA, Wood MA. Cardiac Pacing & ICDS. 3rd ed. Malden: Blackwell Science, Inc; 2002.

- Fogoros RN. Electrophysiologic Testing. 3rd ed. Malden: Blackwell Science, Inc; 1999.

- Hayes DL, Lloyd MA, Friedman PA. Cardiac Pacing and Defibrillation: A Clinical Approach. Armonk: Futura; 2000.

- Moses HW, Moulton KP, Miller BD, et al. A Practical Guide to Cardiac Pacing. 4th ed. Boston: Little, Brown; 1995.

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