EVERA MRI™ S DR SURESCAN® DDMC3D4

MR Conditional with PhysioCurve® Design, SmartShock® 2.0 Technology, Complete Capture Management™

Specifications – IS1/DF4

Product Specifications

Physical characteristics

Volume[a]	34 cm^3
Mass	78 g
H x W x D	68 mm x 51 mm x 13 mm
Surface area of device can	57 cm^2
Radiopaque ID[b]	PFZ
Materials in contact with human tissue[c]	Titanium, polyurethane, silicone rubber
Battery	Hybrid CFx lithium/silver vanadium oxide

[a] Volume with connector ports unplugged.
[b] The radiopaque ID, which includes a Medtronic-identifier symbol, can be viewed in a fluoroscopic image of the device.
[c] These materials have been successfully tested for the ability to avoid biological incompatibility. The device does not produce an injurious temperature in the surrounding tissue during normal operation.

Replacement indicators

Recommended Replacement Time (RRT)	≤ 2.73 V on 3 consecutive daily automatic measurements
End of Service (EOS)	3 months after RRT

Maximum energy levels and typical full energy charge times

Maximum programmed energy	35 J
Maximum delivered energy[a,b]	36 J
Maximum stored energy[c]	42 J
Typical charge time at Beginning of Service (BOS)[d]	8.3 s
Typical charge time at Recommended Replacement Time (RRT)[d]	12.3 s

[a] Energy delivered at connector block into a 50 Ω load.
[b] For 35 J programmed energy, delivered energy exceeds 35 J.
[c] Energy stored at charge end on capacitor.
[d] Charge time during a nonwireless telemetry session may be slightly higher.

Device parameters

Tachyarrhythmia detection parameters

Parameter	Programmable values
AT/AF Detection	On; Monitor ◆
Zones	1 ◆; 2
AT/AF Interval (Rate)[a]	150; 160 … 350 ◆ … 450 ms
Fast AT/AF Interval (Rate)[a]	150; 160 … 200 ◆ … 250 ms
VF Detection[b]	On ◆; Off
VF Interval (Rate)[a]	240; 250 … 320 ◆ … 400 ms
VF Initial Beats to Detect	12/16; 18/24; 24/32; 30/40 ◆; 45/60; 60/80; 75/100; 90/120; 105/140; 120/160
VF Beats to Redetect	6/8; 9/12; 12/16 ◆; 18/24; 21/28; 24/32; 27/36; 30/40
FVT Detection	Off ◆; via VF; via VT
FVT Interval (Rate)[a]	200; 210 … 240 ◆ … 600 ms
VT Detection	On; Off ◆
VT Interval (Rate)[a]	280; 290 … 360 ◆ … 650 ms
VT Initial Beats to Detect	12; 16 ◆ … 52; 76; 100
VT Beats to Redetect	8; 12 ◆ … 52
VT Monitor	Monitor ◆; Off
VT Monitor Interval (Rate)[a]	280; 290 … 450 ◆ … 650 ms
Monitored VT Beats to Detect	16; 20; 24; 28; 32 ◆ … 56; 80; 110; 130

Tachyarrhythmia detection parameters, *continued*

Parameter	Programmable values
PR Logic®/Wavelet	
AF/Afl[b]	On ◆; Off
Sinus Tach[b]	On ◆; Off
Other 1:1 SVTs	On; Off ◆
Wavelet[b]	On ◆; Off; Monitor
Template	[date]
Match Threshold	40; 43; 46 … 70 ◆ … 97%
Auto Collection	On ◆; Off
SVT V. Limit[a]	240; 250; 260 ◆ … 650 ms
Other enhancements	
Stability[a]	Off ◆; 30; 40 … 100 ms
Onset	Off ◆; On; Monitor
Onset Percent	72; 75; 78; 81 ◆; 84; 88; 91; 94; 97%
High Rate Timeout	
VF Zone Only	Off ◆; 0.25; 0.5; 0.75; 1; 1.25; 1.5; 1.75; 2; 2.5; 3; 3.5; 4; 4.5; 5 min
All Zones	Off ◆; 0.5; 1; 1.5 … 5; 6; 7 … 20; 22; 24; 26; 28; 30 min
T-Wave	On ◆; Off
RV Lead Noise	On; On+Timeout ◆; Off
Timeout	0.25; 0.5; 0.75 ◆ … 2 min
Sensitivity	
Atrial[c,d]	0.15; 0.30 ◆; 0.45; 0.60; 0.90; 1.20; 1.50; 1.80; 2.10; 4.00 mV
RV[c,d]	0.15; 0.30 ◆; 0.45; 0.60; 0.90; 1.20 mV

[a] The measured intervals are truncated to a 10 ms multiple (for example, 457 ms becomes 450 ms). The device uses this truncated interval value when applying the programmed criteria and calculating interval averages.
[b] The AF/Afl, Sinus Tach, and Wavelet features are automatically set to On when VF Detection is set to On.
[c] This setting applies to all sensing in this chamber for both tachyarrhythmia detection and bradycardia pacing operations.
[d] Carefully evaluate the possibility of increased susceptibility to EMI and oversensing before changing the sensitivity threshold to its minimum (most sensitive) setting of 0.15 mV. When susceptibility to modulated interference is tested under the conditions specified in CENELEC standard EN 45502-2-2:2008, clause 27.5.1, the device may sense the interference if the sensitivity threshold is programmed to the minimum value of 0.15 mV. The device complies with the requirements of clause 27.5.1 when the sensitivity threshold is programmed to 0.3 mV or higher.

Atrial tachyarrhythmia therapy parameters

Parameter	Programmable values
Antitachy Pacing (ATP)	
AT/AF Rx Status	On; Off ◆
Therapy Type	50 Hz; Ramp; Burst+ Rx1: Ramp ◆; Rx2: Burst+ ◆; Rx3: 50 Hz ◆
Fast AT/AF Rx Status	On; Off ◆
Therapy Type	50 Hz; Ramp; Burst+ Rx1: Ramp ◆; Rx2: Burst+ ◆; Rx3: 50 Hz ◆
Patient-Activated CV	
Patient-Activated CV Status	On; Off ◆
Energy	0.4; 0.6 … 1.8; 2; 3 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 ◆ J
Pathway[a]	AX>B; B>AX ◆
Automatic CV	
AT/AF Automatic CV Status	On; Off ◆
Energy	0.4; 0.6 … 1.8; 2; 3 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 ◆ J
Pathway[a]	AX>B; B>AX ◆
Fast AT/AF Automatic CV Status	On; Off ◆
Energy	0.4; 0.6 … 1.8; 2; 3 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 ◆ J
Pathway[a]	AX>B; B>AX ◆
Shared CV	
Minimum R-R Interval[b]	400; 410 … 500 ◆ … 600 ms
Active Can®/SVC Coil[c]	Can+SVC On ◆; Can Off; SVC Off
Automatic CV Limits	
Delivery Window Start Time	00:00; 01:00; 02:00; 03:00 ◆… 23:00
Delivery Window Length	1 ◆; 2; 3; 4; 6; 8; 10; 12; 16; 20; 24 hr
Maximum Shocks per Day	1 ◆; 2; 3; 4; 5; No Limit
Episode Duration before Rx Delivery	
Episode Duration before CV	0; 1; 2; 3; 4; 5; 7; 10; 15; 20; 25; 30; 40; 50 min; 1; 2; 3; 4; 5; 6 ◆; 12; 24; 48; 72 hr; 7 days
50 Hz Burst parameters	
50 Hz Burst Duration	0.5; 1 ◆; 2; 3 s
# Sequences	1; 2 ◆ … 10
Burst+ parameters	
Initial # S1 Pulses	1; 2 … 15 ◆; 20; 25
A-S1 Interval (%AA)	28; 31; 34; 38; 41 … 59; 63; 66 … 84; 88; 91 ◆; 94; 97%
S1-S2 (%AA)	28; 31; 34; 38; 41 … 59; 63; 66; 69 … 84 ◆; 88; 91; 94; 97%; Off
S2-S3 Decrement	0; 10 ◆; 20 … 80 ms; Off
Interval Decrement	0; 10 ◆ … 40 ms
# Sequences	1; 2 … 6 ◆ … 10
Ramp parameters	
Initial # S1 Pulses	1; 2 … 6 ◆ … 15; 20; 25
A-S1 Interval (%AA)	28; 31; 34; 38; 41 … 59; 63; 66 … 84; 88; 91 ◆; 94; 97%
Interval Decrement	0; 10 ◆ … 40 ms
# Sequences	1; 2 … 8 ◆; 9; 10
Stop Atrial Rx after (Shared)	
Rx/Lead Suspect	
Disable Atrial ATP if it accelerates V. rate?	Yes ◆; No
Disable all atrial therapies if atrial lead position is suspect? (Atrial Lead Position Check)	Yes ◆; No
Duration to stop	12; 24; 48 ◆; 72 hr; None
Episode Duration before Rx Delivery	
Episode Duration before ATP	0; 1 ◆; 2; 3; 4; 5; 7; 10; 15; 20; 25; 30; 40; 50 min; 1; 2; 3; 4; 5; 6; 12; 24 hr

Atrial tachyarrhythmia therapy parameters, *continued*

Parameter	Programmable values
Reactive ATP	
Rhythm Change	On ◆; Off
Time Interval	Off; 2; 4; 7 ◆; 12; 24; 36; 48 hr
Shared A. ATP	
A-A Minimum ATP Interval[b]	100; 110; 120; 130 ◆ … 400 ms
A. Pacing Amplitude	1; 2 … 6 ◆; 8 V
A. Pacing Pulse Width	0.1; 0.2 … 1.5 ◆ ms
VVI/VOO Backup Pacing	Off; On (Always); On (Auto-Enable) ◆
VVI/VOO Backup Pacing Rate	60; 70 ◆ … 120 min^{-1}

[a] If the Active Can/SVC Coil parameter is set to Can Off, the Active Can electrode is not used as part of the high voltage delivery pathway. If the Active Can/SVC Coil parameter is set to SVC Off, the SVC Coil electrode is not used as part of the high-voltage delivery pathway.
[b] The measured intervals are truncated to a 10 ms multiple (for example, 457 ms becomes 450 ms). The device uses this truncated interval value when applying the programmed criteria and calculating interval averages.
[c] The Active Can/SVC Coil parameter applies to all automatic, manual, and emergency high-voltage therapies. It also applies to T-Shock™ inductions.

Ventricular tachyarrhythmia therapy parameters

Parameter	Programmable values
VF Therapy parameters	
VF Therapy Status	On ◆; Off
Energy	Rx1-Rx2: 0.4; 0.6 … 1.8; 2; 3 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 ◆ J Rx3-Rx6: 10; 11 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 ◆ J
Pathway[a]	AX>B; B>AX Rx1-Rx4: B>AX ◆; Rx5-Rx6: AX>B ◆
ATP	During Charging ◆; Before Charging; Off
Deliver ATP if last 8 R-R ≥	200; 210 … 240 ◆ … 300 ms
Therapy Type	Burst ◆; Ramp; Ramp+
ChargeSaver®	On ◆; Off
Switch when number of consecutive ATP successes equals	1 ◆; 2; 3; 4; 6; 8; 10
Smart Mode	On ◆; Off
VT/FVT Therapy parameters	
VT Therapy Status	On; Off ◆
FVT Therapy Status	On; Off ◆
Therapy Type	CV; Burst; Ramp; Ramp+ Rx1: Burst ◆; Rx2-Rx6: CV ◆
Energy	0.4; 0.6 … 1.8; 2; 3 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 J VT Rx1-Rx2: 20 ◆ J VT Rx3-Rx6: 35 ◆ J FVT Rx1-Rx6: 35 ◆ J
Pathway[a]	AX>B; B>AX Rx1-Rx4: B>AX ◆; Rx5-Rx6: AX>B ◆
Burst therapy parameters	
Initial # Pulses	1; 2 … 8 ◆ … 15
R-S1 Interval = (%RR)	50; 53; 56; 59; 63; 66 … 84; 88 ◆; 91; 94; 97%
Interval Dec	0; 10 ◆ … 40 ms
# Sequences	1; 2 … 10 VT Therapies: 3 ◆; FVT Therapies: 1 ◆
Smart Mode[b]	On; Off ◆
Ramp therapy parameters	
Initial # Pulses	1; 2 … 8 ◆ … 15
R-S1 Interval = (%RR)	50; 53; 56; 59; 63; 66 … 84; 88; 91 ◆; 94; 97%
Interval Dec	0; 10 ◆ … 40 ms
# Sequences	1; 2 … 10 VT Therapies: 3 ◆; FVT Therapies: 1 ◆
Smart Mode[b]	On; Off ◆
Ramp+ therapy parameters	
Initial # Pulses	1; 2; 3 ◆ … 15
R-S1 Interval = (%RR)	50; 53; 56; 59; 63; 66 … 75 ◆ … 84; 88; 91; 94; 97%
S1S2 (Ramp+) = (%RR)	50; 53; 56; 59; 63; 66; 69 ◆ … 84; 88; 91; 94; 97%
S2SN (Ramp+) = (%RR)	50; 53; 56; 59; 63; 66 ◆ … 84; 88; 91; 94; 97%
# Sequences	1; 2 … 10 VT Therapies: 3 ◆; FVT Therapies: 1 ◆
Smart Mode[b]	On; Off ◆
Shared Settings	
V-V Minimum ATP Interval	150; 160 … 200 ◆ … 400 ms
V. Amplitude	1; 2 … 6; 8 ◆ V
V. Pulse Width	0.1; 0.2 … 1.5 ◆ ms
V. Pace Blanking	150; 160 … 240 ◆ … 450 ms
Active Can/SVC Coil[c]	Can+SVC On ◆; Can Off; SVC Off
Progressive Episode Therapies	On; Off ◆
Confirmation+	On ◆; Off

[a] If the Active Can/SVC Coil parameter is set to Can Off, the Active Can electrode is not used as part of the high voltage delivery pathway. If the Active Can/SVC Coil parameter is set to SVC Off, the SVC Coil electrode is not used as part of the high-voltage delivery pathway.
[b] Smart Mode is available only for Rx1-Rx4.
[c] The Active Can/SVC Coil parameter applies to all automatic, manual, and emergency high-voltage therapies. It also applies to T-Shock inductions.

Pacing parameters

Modes, rates, and intervals

Parameter	Programmable values
Mode	DDDR; DDD; AAIR↔DDDR ◆; AAI↔DDD; DDIR; DDI; AAIR; AAI; VVIR; VVI; DOO; AOO; VOO; ODO
Mode Switch	On ◆; Off
Lower Rate[a]	30; 35 … 60 ◆; 70; 75 … 150 min^{-1} (± 2 min^{-1})
Upper Tracking Rate	80; 85 … 130 ◆ … 175 min^{-1} (± 2 min^{-1})
Paced AV	30; 40 … 180 ◆ … 350 ms (± 4 ms)
Sensed AV	30; 40 … 150 ◆ … 350 ms (+30; –4 ms)
PVARP	Auto ◆; 150; 160 … 500 ms (+5; –30 ms)
Minimum PVARP	150; 160 … 250 ◆ … 500 ms (+5; –30 ms)

Modes, rates, and intervals, *continued*

Parameter	Programmable values
A. Refractory Period	150; 160 … 310 ◈ … 500 ms (+5; –30 ms)

[a] The corresponding Lower Rate Interval can be calculated as follows: Lower Rate Interval (ms) = 60,000/Lower Rate.

Atrial parameters

Parameter	Programmable values
Atrial Amplitude	0.5; 0.75 … 3.5 ◈ … 5; 5.5; 6; 8 V
Atrial Pulse Width	0.03; 0.06; 0.1; 0.2; 0.3; 0.4 ◈ … 1.5 ms
Atrial Sensitivity[a]	0.15 mV (± 75%); 0.3 ◈; 0.45; 0.6 mV (± 50%); 0.9; 1.2; 1.5; 1.8; 2.1; 4.0 mV (± 30%)

[a] This setting applies to all sensing in this chamber for both tachyarrhythmia detection and bradycardia pacing operations.

RV parameters

Parameter	Programmable values
RV Amplitude	0.5; 0.75 … 3.5 ◈ … 5; 5.5; 6; 8 V
RV Pulse Width	0.03; 0.06; 0.1; 0.2; 0.3; 0.4 ◈ … 1.5 ms
RV Sensitivity[a]	0.15 mV (± 75%); 0.3 ◈ ; 0.45; 0.6 mV (± 50%); 0.9; 1.2 mV (± 30%)
RV Pace Polarity	Bipolar; Tip to Coil
RV Sense Polarity	Bipolar; Tip to Coil

[a] This setting applies to all sensing in this chamber for both tachyarrhythmia detection and bradycardia pacing operations.

Atrial Capture Management® parameters

Parameter	Programmable values
Atrial Capture Management	Adaptive ◈; Monitor; Off
Atrial Amplitude Safety Margin	1.5x; 2.0x ◈; 2.5x; 3.0x
Atrial Minimum Adapted Amplitude	1.0; 1.5 ◈; 2.0; 2.5; 3.0; 3.5 V
Atrial Acute Phase Remaining	Off; 30; 60; 90; 120 ◈; 150 days

RV Capture Management parameters

Parameter	Programmable values
RV Capture Management	Adaptive ◈; Monitor; Off
RV Amplitude Safety Margin	1.5x; 2.0x ◈; 2.5x; 3.0x
RV Minimum Adapted Amplitude	1.0; 1.5; 2.0 ◈; 2.5; 3.0; 3.5 V
RV Acute Phase Remaining	Off; 30; 60; 90; 120 ◈; 150 days

Blanking periods

Parameter	Programmable values
PVAB Interval	10; 20 … 150 ◈ … 300 ms[a] 100; 110 … 150 ◈ … 300 ms[b]
PVAB Method	Partial ◈; Partial+; Absolute[c]
A. Blank Post AP	150; 160 … 200 ◈ … 250 ms
A. Blank Post AS	100 ◈; 110 … 170 ms
V. Blank Post VP	150; 160 … 200 ◈ … 450 ms
V. Blank Post VS	120 ◈; 130 … 170 ms

[a] When PVAB Method = Partial+ or Absolute.
[b] When PVAB Method = Partial.
[c] Programming the PVAB method to Absolute automatically resets the interval to 30 ms. If the PVAB method is programmed to Partial or Partial+, the interval resets to 150 ms.

Rate response pacing parameters

Parameter	Programmable values
Upper Sensor Rate	80; 85 … 120 ◈ … 175 min^{-1} (± 2 min^{-1})
ADL Rate	60; 65 … 95 ◈ … 170 min^{-1} (± 2 min^{-1})
Rate Profile Optimisation	On ◈; Off
ADL Response	1; 2; 3 ◈; 4; 5
Exertion Response	1; 2; 3 ◈; 4; 5
Activity Threshold	Low; Medium Low ◈; Medium High; High
Activity Acceleration	15; 30 ◈; 60 s
Activity Deceleration	Exercise ◈; 2.5; 5; 10 min
ADL Setpoint	5; 6 … 40; 42 … 80
UR Setpoint	15; 16 … 40; 42 … 80; 85 … 180

Rate adaptive AV parameters

Parameter	Programmable values
Rate Adaptive AV	On; Off ◈
Start Rate	50; 55 … 90 ◈ … 145 min^{-1}
Stop Rate	55; 60 … 130 ◈ … 175 min^{-1}
Minimum Paced AV	30; 40 … 140 ◈ … 200 ms
Minimum Sensed AV	30; 40 … 110 ◈ … 200 ms

Atrial rate stabilisation parameters

Parameter	Programmable values
A. Rate Stabilisation	On; Off ◈
Maximum Rate	80; 85 … 100 ◈ … 150 min^{-1}
Interval Percentage Increment	12.5; 25 ◈; 50%

Atrial preference pacing parameters

Parameter	Programmable values
A. Preference Pacing	On; Off ◈
Maximum Rate	80; 85 … 100 ◈ … 150 min^{-1}
Interval Decrement	30 ◈; 40 … 100; 150 ms
Search Beats	5; 10; 15; 20 ◈ … 25; 50

Post Mode Switch Overdrive Pacing (PMOP) parameters

Parameter	Programmable values
Post Mode Switch	On; Off ◈
Overdrive Rate	70; 75; 80 ◈ … 120 min^{-1}
Overdrive Duration	0.5; 1; 2; 3; 5; 10 ◈; 20; 30; 60; 90; 120 min

Conducted AF response parameters

Parameter	Programmable values
Conducted AF Response	On; Off ◈
Response Level	Low; Medium ◈; High
Maximum Rate	80; 85 … 110 ◈ … 130 min^{-1}

Ventricular rate stabilisation parameters

Parameter	Programmable values
V. Rate Stabilisation	On; Off ◈
Maximum Rate	80; 85 … 100 ◈ … 120 min^{-1}
Interval Increment	100; 110 … 150 ◈ … 400 ms

Post VT/VF shock pacing parameters

Parameter	Programmable values
Post VT/VF Shock Pacing	On; Off ◆
Overdrive Rate	70; 75; 80 ◆ … 120 min^{-1}
Overdrive Duration	0.5 ◆; 1; 2; 3; 5; 10; 20; 30; 60; 90; 120 min

Post shock pacing parameters

Parameter	Programmable values
Post Shock A. Amplitude	1; 2; 3; 4 ◆; 5; 6; 8 V
Post Shock A. Pulse Width	0.1; 0.2 … 1.5 ◆ ms
Post Shock V. Amplitude	1; 2 … 6 ◆; 8 V
Post Shock V. Pulse Width	0.1; 0.2 … 1.5 ◆ ms

Rate drop response parameters

Parameter	Programmable values
Rate Drop Response[a]	On; Off ◆
Detection Type	Drop ◆; Low Rate; Both
Drop Size	10; 15 … 25 ◆ … 50 min^{-1}
Drop Rate	30; 40 … 60 ◆ … 100 min^{-1}
Detection Window	10; 15; 20; 25; 30 s 1 ◆; 1.5; 2; 2.5 min
Detection Beats	1; 2; 3 ◆ beats
Intervention Rate	70; 75 … 100 ◆ … 150 min^{-1}
Intervention Duration	1; 2 ◆ … 15 min

[a] When Rate Drop Response is set to On, the lower rate is automatically set to 45 min^{-1}.

Sleep parameters

Parameter	Programmable values
Sleep	On; Off ◆
Sleep Rate	30; 35 … 50 ◆; 55; 60; 70; 75 … 100 min^{-1}
Bed Time	00:00; 00:10 … 22:00 ◆ … 23:50
Wake Time	00:00; 00:10 … 07:00 ◆ … 23:50

Non-Competitive Atrial Pacing (NCAP) parameters

Parameter	Programmable values
Non-Comp Atrial Pacing	On ◆; Off
NCAP Interval	200; 250; 300 ◆; 350; 400 ms

MRI SureScan parameters

Parameter	Programmable values
MRI SureScan	On; Off
MRI Pacing Mode	DOO (Asynchronous); AOO (Asynchronous); VOO (Asynchronous); ODO (Off)
MRI Pacing Rate	60; 70; 75… 120 min^{-1}

Additional pacing features

Parameter	Programmable values
Rate Hysteresis	Off ◆; 30; 40 … 80 min^{-1}
PMT Intervention	On; Off ◆
PVC Response	On ◆; Off
V. Safety Pacing	On ◆; Off

Medtronic CareAlert® parameters

Clinical management alerts

Parameter	Programmable values
AT/AF Burden and Rate Settings …	
Device Tone	
Alert Urgency[a]	High ◆; Low
AT/AF Daily Burden Alert Enable	Off (Observation only) ◆; On
Avg. V. Rate During AT/AF Alert Enable	Off (Observation only) ◆; On
Patient Home Monitor	
AT/AF Daily Burden Alert Enable[b]	Off ◆; On
Avg. V. Rate During AT/AF Alert Enable[b]	Off ◆; On
Shared (Device Tone and Patient Home Monitor)	
AT/AF Daily Burden	0.5; 1; 2; 6 ◆; 12; 24 hours/day
Avg. V. Rate During AT/AF	90; 100 ◆ … 150 min^{-1}
Daily Burden for Avg. V. Rate	0.5; 1; 2; 6 ◆; 12; 24 hours/day
Number of Shocks Delivered in an Episode[c]	
Device Tone	
Alert Enable – Urgency	Off ◆; On-Low; On-High
Patient Home Monitor	
Alert Enable[b]	Off ◆; On
Shared (Device Tone and Patient Home Monitor)	
Number of Shocks Threshold[a]	1 ◆; 2; 3; 4; 5; 6
All Therapies in a Zone Exhausted for an Episode	
Device Tone	
Alert Enable – Urgency	Off ◆; On-Low; On-High
Patient Home Monitor	
Alert Enable[b]	Off ◆; On

[a] This parameter is displayed only if an associated alert has been enabled.
[b] Alerts are programmable and transmittable to a monitor only when Patient Home Monitor is programmed to Yes.
[c] Note that VF, VT, and FVT therapies could be delivered during a single episode (from initial detection until episode termination).

Lead/Device integrity alerts

Parameter	Programmable values
RV Lead	
Device Tone	
Alert Urgency[a]	Low; High ◆
RV Lead Integrity Enable	On ◆; Off
RV Lead Noise Enable	On ◆; Off
Patient Home Monitor	
RV Lead Integrity Enable	On ◆; Off
RV Lead Noise Enable	On ◆; Off
Lead Impedance Out of Range	
Device Tone	
Alert Urgency[a]	Low; High ◆
A. Pacing Impedance Enable	On ◆; Off (Observation only)
RV Pacing Impedance Enable	On ◆; Off (Observation only)

Lead/Device integrity alerts, *continued*

Parameter	Programmable values
RV Defibrillation Impedance Enable	On ◆; Off (Observation only)
SVC Defibrillation Impedance Enable[b]	On ◆; Off (Observation only)
Patient Home Monitor	
A. Pacing Impedance Enable[c]	Off; On ◆
RV Pacing Impedance Enable[c]	Off; On ◆
RV Defibrillation Impedance Enable[c]	Off; On ◆
SVC Defibrillation Impedance Enable[b,c]	Off; On ◆
Shared (Device Tone and Patient Home Monitor)	
A. Pacing Impedance Less than	200 ◆; 300; 400; 500 Ω
A. Pacing Impedance Greater than	1,000; 1,500; 2,000; 3,000 ◆ Ω
RV Pacing Impedance Less than	200 ◆; 300; 400; 500 Ω
RV Pacing Impedance Greater than	1,000; 1,500; 2,000; 3,000 ◆ Ω
RV Defibrillation Impedance Less than	20 ◆; 30; 40; 50 Ω
RV Defibrillation Impedance Greater than	100; 130; 160; 200 ◆ Ω
SVC Defibrillation Impedance Less than	20 ◆; 30; 40; 50 Ω
SVC Defibrillation Impedance Greater than	100; 130; 160; 200 ◆ Ω
Low Battery Voltage RRT	
Device Tone	
Alert Enable – Urgency	Off; On-Low; On-High ◆
Patient Home Monitor	
Alert Enable[c]	Off; On ◆
Excessive Charge Time EOS	
Device Tone	
Alert Enable – Urgency	Off; On-Low; On-High ◆
Patient Home Monitor	
Alert Enable[c]	Off; On ◆
VF Detection Off, 3+ VF or 3+ FVT Rx Off	
Device Tone	
Alert Enable	Off; On-High ◆
Patient Home Monitor	
Alert Enable[c]	Off; On ◆

[a] This parameter is displayed only if an associated alert has been enabled.
[b] If an SVC lead is not implanted, the alert will not sound.
[c] Alerts are programmable and transmittable to a monitor only when Patient Home Monitor is programmed to Yes.

Shared parameters

Parameter	Programmable values
Patient Home Monitor	Yes; No ◆
Alert Time[a]	00:00; 00:10 … 08:00 ◆ … 23:50

[a] This parameter is displayed only if an associated alert has been enabled.

Data collection parameters

Data collection parameters

Parameter	Programmable values
LECG Source (Leadless ECG)[a]	Can to SVC ◆[b,c]; RVcoil to Aring; Can to Aring
LECG Range (Leadless ECG)	±1; ±2 ◆; ±4; ±8; ±12; ±16; ±32 mV
EGM 1 Source	RVtip to RVcoil; RVtip to RVring; Atip to RVring; Atip to Aring ◆; Aring to RVring; Aring to RVcoil
EGM 1 Range	±1; ±2; ±4; ±8 ◆; ±12; ±16; ±32 mV
EGM 2 (Wavelet) Source	Can to RVcoil ◆; Can to RVring; RVtip to RVcoil; RVtip to RVring; Can to SVC[b,c]; RVcoil to SVC[b]
EGM 2 (Wavelet) Range	±1; ±2; ±4; ±8; ±12 ◆; ±16; ±32 mV
EGM 3 Source	RVtip to RVcoil; RVtip to RVring ◆
EGM 3 Range	±1; ±2; ±4; ±8 ◆; ±12; ±16; ±32 mV
Monitored	EGM1 and EGM2; EGM1 and EGM3 ◆; EGM1 and LECG; EGM2 and EGM3; EGM2 and LECG; EGM3 and LECG
Pre-arrhythmia EGM	Off ◆; On – 1 month; On – 3 months; On Continuous
Device Date/Time[d]	(enter time and date)
Holter Telemetry	Off ◆; 0.5; 1; 2; 4; 8; 16; 24; 36; 46 hr

[a] This EGM channel displays far-field signals. To display an approximation of a surface ECG signal, choose the Can to SVC EGM source.
[b] An SVC electrode must be present for this configuration.
[c] If Can to SVC is selected, the EGM Range is automatically set to ± 2 mV. The EGM Range is automatically set to ± 8 mV for all other EGM Source options.
[d] The times and dates stored in episode records and other data are determined by the Device Date/Time clock.

System test parameters

System test parameters

Parameter	Selectable values
Pacing Threshold Test parameters	
Test Type	Amplitude; Pulse Width
Chamber	Atrium; RV
Decrement after	2; 3 … 15 pulses
RV Pace Polarity	Bipolar; Tip to Coil
Mode[a] (RV test)	VVI; VOO; DDI; DDD; DOO
Mode[a] (Atrium test)	AAI; AOO; DDI; DDD; DOO
Lower Rate[b]	30; 35 … 60; 70; 75 … 150 min^{-1}
RV Amplitude	0.25; 0.5 … 5; 5.5; 6; 8 V
RV Pulse Width	0.03; 0.06; 0.1; 0.2 … 1.5 ms
A. Amplitude	0.25; 0.5 … 5; 5.5; 6; 8 V
A. Pulse Width	0.03; 0.06; 0.1; 0.2 … 1.5 ms
AV Delay	30; 40 … 350 ms
V. Pace Blanking	150; 160 … 450 ms
A. Pace Blanking	150; 160 … 250 ms
PVARP[c]	150; 160 … 500 ms
Sensing Test parameters	
Mode[a]	AAI; DDD; DDI; VVI; ODO
AV Delay	30; 40 … 350 ms
Lower Rate[b]	30; 35 … 60; 70; 75 … 120 min^{-1}

System test parameters, *continued*

Parameter	Selectable values
Wavelet Test parameters	
Match Threshold	40; 43 … 70 ◆ … 97
Mode[a]	AAI; DDD; DDI; VVI; ODO
AV Delay	30; 40 … 350 ms
Lower Rate[b]	30; 35 … 60; 70; 75 … 120 min^{-1}

[a] The selectable values for this parameter depend on the programmed pacing mode.
[b] When performing the test in DDD mode, the Lower Rate must be less than the programmed Upper Tracking Rate.
[c] The selectable values for this parameter depend on the programmed PVAB values.

EP study parameters

T-Shock induction parameters

Parameter	Selectable values
Resume at Deliver	Enabled ◆; Disabled
Enable	Enabled; Disabled ◆
#S1	2; 3; 4; 5 ◆; 6; 7; 8
S1S1	300; 310 … 400 ◆ … 2,000 ms
Delay	20; 30 … 300 ◆ … 600 ms
Energy	0.4; 0.6; 0.8; 1.0 ◆ … 1.8; 2; 3; 4 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 J
Waveform	Monophasic ◆; Biphasic
Pathway[a]	AX>B; B>AX ◆

[a] If the Active Can/SVC Coil parameter is set to Can Off, the Active Can electrode is not used as part of the high voltage delivery pathway. If the Active Can/SVC Coil parameter is set to SVC Off, the SVC Coil electrode is not used as part of the high-voltage delivery pathway.

50 Hz Burst induction parameters

Parameter	Selectable values
Resume at Burst	Enabled ◆; Disabled
Chamber	Atrium; RV
Amplitude	1; 2; 3; 4 ◆; 5; 6; 8 V
Pulse Width	0.10; 0.20 … 0.50 ◆ … 1.50 ms
VOO Backup (for atrial 50 Hz Burst)	On; Off ◆
Pacing Rate	60; 70 ◆ … 120 min^{-1}
V. Amplitude[a,b]	0.50; 0.75 … 5.00; 5.50; 6.00; 8.00 V
V. Pulse Width[a]	0.10; 0.20 … 1.50 ms

[a] The default value for this parameter is set according to the permanently programmed settings for bradycardia pacing.
[b] Crosstalk may occur when atrial pacing amplitude is greater than 6.0 V.

Fixed Burst induction parameters

Parameter	Selectable values
Resume at Burst	Enabled ◆; Disabled
Chamber	Atrium; RV
Interval	100; 110 … 600 ◆ ms
Amplitude	1; 2; 3; 4 ◆; 5; 6; 8 V
Pulse Width	0.10; 0.20 … 0.50 ◆ … 1.50 ms
VVI Backup (for atrial Fixed Burst)	On; Off ◆
Pacing Rate	60; 70 ◆ … 120 min^{-1}
V. Amplitude[a,b]	0.50; 0.75 … 5.00; 5.50; 6.00; 8.00 V
V. Pulse Width[a]	0.10; 0.20 … 1.50 ms

[a] The default value for this parameter is set according to the permanently programmed settings for bradycardia pacing.
[b] Crosstalk may occur when atrial pacing amplitude is greater than 6.0 V.

PES induction parameters

Parameter	Selectable values
Resume at Deliver	Enabled ◆; Disabled
Chamber	Atrium; RV
#S1	1; 2 … 8 ◆ … 15
S1S1	100; 110 … 600 ◆ … 2,000 ms
S1S2	Off; 100; 110 … 400 ◆ … 600 ms
S2S3	Off ◆; 100; 110 … 400; 410 … 600 ms[a]
S3S4	Off ◆; 100; 110 … 400; 410 … 600 ms[a]
Amplitude	1; 2; 3; 4 ◆; 5; 6; 8 V
Pulse Width	0.10; 0.20 … 0.50 ◆ … 1.50 ms
VVI Backup (for atrial PES)	On; Off ◆
Pacing Rate	60; 70 ◆ … 120 min^{-1}
V. Amplitude[b,c]	0.50; 0.75 … 5.00; 5.50; 6.00; 8.00 V
V. Pulse Width[b]	0.10; 0.20 … 1.50 ms

[a] Default value when parameter is On is 400 ms.
[b] The default value for this parameter is set according to the permanently programmed settings for bradycardia pacing.
[c] Crosstalk may occur when atrial pacing amplitude is greater than 6.0 V.

Manual defibrillation parameters

Parameter	Selectable values
Energy	0.4; 0.6 … 1.8; 2; 3 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 ◆ J
Pathway[a]	AX>B; B>AX ◆

[a] If the Active Can/SVC Coil parameter is set to Can Off, the Active Can electrode is not used as part of the high voltage delivery pathway. If the Active Can/SVC Coil parameter is set to SVC Off, the SVC Coil electrode is not used as part of the high-voltage delivery pathway.

Manual cardioversion parameters

Parameter	Selectable values
Chamber	Atrium; RV
Energy	0.4; 0.6 … 1.8; 2; 3 … 16; 18; 20; 22; 24; 25; 26; 28; 30; 32; 35 ◆ J
Pathway[a]	AX>B; B>AX ◆
Minimum R-R (atrial CV only)	400; 410 … 500 ◆ … 600 ms

[a] If the Active Can/SVC Coil parameter is set to Can Off, the Active Can electrode is not used as part of the high-voltage delivery pathway. If the Active Can/SVC Coil parameter is set to SVC Off, the SVC Coil electrode is not used as part of the high-voltage delivery pathway.

Shared manual ATP therapy parameters

Parameter	Selectable values
Minimum Interval (atrial ATP)	100; 110; 120; 130 ◆ … 400 ms
Minimum Interval (ventricular ATP)	150; 160 … 200 ◆ … 400 ms
Amplitude	1; 2 … 6 ◆; 8 V
Pulse Width	0.10; 0.20 … 1.50 ◆ ms
VVI Backup (for atrial ATP therapy)	On; Off ◆
Pacing Rate	60; 70 ◆ … 120 min^{-1}
V. Amplitude[a,b]	0.50; 0.75 … 5.00; 5.50; 6.00; 8.00 V
V. Pulse Width[a]	0.10; 0.20 … 1.50 ms

[a] The default value for this parameter is set according to the permanently programmed settings for bradycardia pacing.
[b] Crosstalk may occur when atrial pacing amplitude is greater than 6.0 V.

Manual Ramp therapy parameters

Parameter	Selectable values
Chamber	Atrium; RV
RV Ramp therapy parameters	
# Pulses	1; 2 … 6 ◈ … 15
%RR Interval	50; 53; 56; 59; 63; 66 … 84; 88; 91; 94; 97 ◈ %
Dec/Pulse	0; 10 ◈; 20; 30; 40 ms
Atrial Ramp therapy parameters	
# Pulses	1; 2 … 6 ◈ … 15; 20; 30 … 100
%AA Interval	28; 31; 34; 38; 41 … 59; 63; 66 … 84; 88; 91; 94; 97 ◈ %
Dec/Pulse	0; 10 ◈; 20; 30; 40 ms

Manual Burst therapy parameters

Parameter	Selectable values
# Pulses	1; 2 … 8 ◈ … 15
%RR Interval	50; 53; 56; 59; 63; 66 … 84; 88 ◈ ; 91; 94; 97%

Manual Ramp+ therapy parameters

Parameter	Selectable values
# Pulses	1; 2; 3 ◈ … 15
R-S1 (%RR)	50; 53; 56; 59; 63; 66 … 75 ◈ … 84; 88; 91; 94; 97%
S1-S2 (%RR)	50; 53; 56; 59; 63; 66; 69 ◈ … 84; 88; 91; 94; 97%
S2-SN (%RR)	50; 53; 56; 59; 63; 66 ◈ … 84; 88; 91; 94; 97%

Manual Burst+ therapy parameters

Parameter	Selectable values
# S1 Pulses	1; 2 … 6 ◈ … 15; 20; 30 … 100
%AA Interval	28; 31; 34; 38; 41 … 59; 63; 66 … 84; 88; 91 ◈; 94; 97%
S1S2	Off; 28; 31; 34; 38; 41 … 59; 63; 66 … 84 ◈; 88; 91; 94; 97%
S2S3 Dec	Off; 0; 10; 20 ◈ … 80 ms

Longevity

Projected service life in years

		Projected service life in years	
Pacing Mode, percent pacing	Pacing Amplitude	500 Ω pacing impedance	600 Ω pacing impedance
DDD, 0%	2.5 V 3.5 V	9.7 9.6	9.7 9.6
DDD, 15%	2.5 V 3.5 V	9.1 8.7	9.2 8.8
DDD, 50%	2.5 V 3.5 V	8.3 7.1	8.5 7.4
DDD, 100%	2.5 V 3.5 V	7.3 5.7	7.6 6.1

The service life projections are based on the following assumptions:
- Semi-annual maximum energy charging frequency
- Pre-arrhythmia EGM storage programmed to On for a 6-month period (two 3-month follow-up intervals), over the entire life of the device
- 3 hours of wireless telemetry during implant
- A quarterly schedule of Medtronic CareLink Monitor remote transmissions
- 1 hour of in-office wireless telemetry annually
- Typical shelf storage time before implant

Projected service life estimates are based on accelerated battery discharge data and device modeling as specified.
Do not interpret these values as precise numbers.

Projected service life in years, with the Pacing Mode programmed to AAI ↔ DDD

		Projected service life in years	
Pacing Mode, percent pacing	Pacing Amplitude	500 Ω pacing impedance	600 Ω pacing impedance
AAI↔DDD (MVP® Mode) 50% atrial, 5% ventricular	2.5 V 3.5V	8.9 8.2	9.0 8.3

Brief Statement
See the device manual for detailed information regarding the implant procedure, indications, contraindications, warnings, precautions, and potential adverse events.

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