

PERCEPTA™ QUAD CRT-P MRI SURESCAN™

Model W4TR04



Heart Failure Management Report

This report provides an overview of the patient's condition over the short and long term, with a focus on heart failure management. The report includes graphs that show OptiVol™ 2.0 fluid trends and trends related to heart failure over the last 14 months.

Physical characteristics

Volume ^a	20.5 cm ³
Mass	30 g
H x W x D ^b	59 mm x 46.5 mm x 11 mm
Radiopaque ID ^c	RNP
Surface area of titanium device can	40.7 cm ²
Materials in contact with human tissue ^d	Titanium, polyurethane, silicone rubber
Battery	Lithium-hybrid CFx silver vanadium oxide

^a Volume with connector holes unplugged.

^b Grommets may protrude slightly beyond the can surface.

^c The radiopaque ID, which includes a Medtronic-identifier symbol, can be viewed in a fluoroscopic image of the device.

^d 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)	180 days after 3 consecutive daily automatic measurements of ≤ 2.63 V or immediately after 3 consecutive daily automatic measurements of ≤ 2.60 V, whichever comes first
Elective Replacement Indicator (ERI)	3 months after RRT
End of Service (EOS)	3 months after ERI

- MR Conditional with SureScan™ Technology
- Bluetooth® Wireless Telemetry
- EffectivCRT™ Diagnostic
- AdaptivCRT™ Algorithm
- EffectivCRT™ During AF Algorithm
- Multiple Point Pacing
- VectorExpress™ 2.0 LV Automated Test
- CardioSync™ Optimisation
- OptiVol™ 2.0 Fluid Status Monitoring
- MVP™ Mode
- Complete Capture Management™ Diagnostic (ACM, RVCM, LVCM)

Tachyarrhythmia detection 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
VT Monitor	Monitor  ; Off
VT Monitor Interval (Rate) ^a	280; 290 ... 400  ... 500 ms
RV Sensitivity ^b	0.45; 0.60 mV (± 50%); 0.90; 1.20; 2.00; 2.80; 4.00; 5.60; 8.00; 11.30 mV (± 30%) Bipolar: 0.9  mV Unipolar: 2.80  mV
Atrial Sensitivity ^c	0.15 mV (± 75%); 0.30; 0.45; 0.60 mV (± 50%); 0.90; 1.20; 1.5; 1.8; 2.1; 4.0 mV (± 30%); Off Bipolar: 0.3  mV Unipolar: 0.45  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 device complies with the requirements of ISO 14708-2 when the sensitivity threshold is programmed to 2.0 mV or higher.

^c The device complies with the requirements of ISO 14708-2 when the sensitivity threshold is programmed to 1.8 mV or higher.

Atrial tachyarrhythmia therapy parameters

Parameter	Programmable values
Antitachy Pacing (ATP)	
Fast AT/AF Rx Status	On; Off 
Therapy Type	Ramp; Burst+ Rx1: Ramp  ; Rx2: Burst+  ; Rx3: Ramp 
AT/AF Rx Status	On; Off 
Therapy Type	Ramp; Burst+ Rx1: Ramp  ; Rx2: Burst+  ; Rx3: Ramp 

Burst+ parameters

Initial # S1 Pulses	1; 2; 3 ... 11  ... 15; 20; 25
A-S1 Interval (%AA)	28; 31; 34; 38; 41 ... 59; 63; 66; 69 ... 84  ; 88; 91; 94; 97%
S1-S2 (%AA)	28; 31; 34; 38; 41 ... 59; 63; 66; 69 ... 81  ; 84; 88; 91; 94; 97%; Off
S2-S3 Decrement	0; 10; 20  ... 80 ms; Off
Interval Decrement	0; 10  ; 20; 30; 40 ms
# Sequences	1; 2; 3 ... 10 

Ramp parameters

Initial # S1 Pulses	1; 2; 3 ... 13  ; 14; 15; 20; 25
A-S1 Interval (%AA)	
Rx1	28; 31; 34; 38; 41 ... 59; 63; 66 ... 84; 88; 91  ; 94; 97%
Rx2	28; 31; 34; 38; 41 ... 59; 63; 66 ... 84; 88; 91  ; 94; 97%
Rx3	28; 31; 34; 38; 41 ... 59; 63; 66 ... 81  ; 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 ... 5; 7; 10; 15; 20; 25; 30; 40; 50 min; 1; 2; 3; 4; 5; 6; 12; 24 hr
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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 ^a	100; 110 ... 150  ... 400 ms (± 6 ms)
A. Pacing Amplitude	1; 2 V (+0.5 V -33%) 3; 4; 5; 6  ; 8 V (+20%/-33%)
A. Pacing Pulse Width	0.1; 0.2 ... 1.5  ms (± 25 µs)
VVI Backup Pacing	Off; On (Always); On (Auto-Enable) 
VVI Backup Pacing Rate	60; 70  ... 120 min ⁻¹

^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.

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 ... 50  ; 70; 75 ... 150 min ⁻¹ (±2 min ⁻¹)
Upper Tracking Rate	80; 85 ... 130  ... 175 min ⁻¹ (±2 min ⁻¹); 180; 190 ... 210 min ⁻¹ (+2/-11 min ⁻¹)
Paced AV ^b	30; 40 ... 130  ... 350 ms (± 4 ms)
Sensed AV ^b	30; 40 ... 100  ... 350 ms (+30; -2 ms)
Maximum AV Interval Limit	Off  ; 250; 260 ... 500 ms
PVARP	Auto  ; 150; 160 ... 500 ms (+5; -30 ms)
Minimum PVARP	150; 160 ... 250  ... 500 ms (+5; -30 ms)
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.

^b If CRT is adaptive, Paced AV and Sensed AV cannot be selected or programmed.

Atrial parameters

Parameter	Programmable values
Atrial Amplitude	0.5; 0.75 ... 1.25 V (+0.125 V/-33%) 1.50 ... 3.5 $\diamond$... 5; 5.5; 6; 8 V (+15%/-33%) ^a
Atrial Pulse Width	0.03; 0.06 ms ($\pm 10 \mu$ s); 0.1; 0.2; 0.3; 0.4 $\diamond$... 1.5 ms ($\pm 25 \mu$ s)
Atrial Sensitivity	Off; 0.15; 0.3; 0.45; 0.6 mV ($\pm 60\%$); 0.9; 1.2; 1.5; 1.8; 2.1; 4.0 mV ($\pm 40\%$) Unipolar: 0.45 $\diamond$ mV Bipolar: 0.3 $\diamond$ mV
Atrial Pace Polarity	Bipolar; Unipolar
Atrial Sense Polarity	Bipolar; Unipolar
Atrial Lead Monitor	Monitor Only; Adaptive
Min Limit	200 $\diamond$; 300; 400; 500 Ω
Max Limit	1,000; 1,500; 2,000; 3,000 $\diamond$ Ω

^a When Atrial Amplitude is 8 V, Atrial Pulse Width must be less than 1.3 ms.

RV parameters

Parameter	Programmable values
RV Amplitude	0.5; 0.75 ... 1.25 V (+0.125 V / -33%) 1.50 ... 3.5 $\diamond$... 5; 5.5; 6; 8 V (+15%/-33%) ^a
RV Pulse Width	0.03; 0.06 ms ($\pm 10 \mu$ s); 0.1; 0.2; 0.3; 0.4 $\diamond$... 1.5 ms ($\pm 25 \mu$ s)
RV Sensitivity	0.45; 0.60; 0.90; 1.20; 2.00; 2.80; 4.00; 5.60; 8.00; 11.30 mV ($\pm 55\%$) Unipolar: 2.80 $\diamond$ mV Bipolar: 0.90 $\diamond$ mV
RV Pace Polarity	Bipolar; Unipolar
RV Sense Polarity	Bipolar; Unipolar
RV Lead Monitor	Monitor Only; Adaptive
Min Limit	200 $\diamond$; 300; 400; 500 Ω
Max Limit	1,000; 1,500; 2,000; 3,000 $\diamond$ Ω

^a When RV Amplitude is 8 V, RV Pulse Width must be less than 1.3 ms.

LV parameters

Parameter	Programmable values
LV Amplitude	0.5; 0.75 ... 1.25 V (+0.125 V/-33%) 1.50 ... 3.5 $\diamond$... 5; 5.5; 6; 8 V (+15% -33%) ^a
LV Pulse Width	0.03; 0.06 ms ($\pm 10 \mu$ s); 0.1; 0.2; 0.3; 0.4 $\diamond$... 1.5 ms ($\pm 25 \mu$ s)
LV Pace Polarity	LV1 to LV2; LV1 to LV3; LV1 to LV4; LV1 to Can; LV2 to LV1; LV2 to LV3; LV2 to LV4; LV2 to Can; LV3 to LV1; LV3 to LV2; LV3 to LV4; LV3 to Can; LV4 to LV1; LV4 to LV2; LV4 to LV3; LV4 to Can
LV Lead Monitor	Monitor Only; Adaptive
Min Limit	200 $\diamond$; 300; 400; 500 Ω
Max Limit	1,000; 1,500; 2,000; 3,000 $\diamond$ Ω

^a When LV Amplitude is 8 V, LV Pulse Width must be less than 1.3 ms.

2nd LV parameters

Parameter	Programmable values
2nd LV Amplitude	0.5; 0.75 ... 1.25 V (+0.125 V / -33%) 1.50 ... 3.5 $\diamond$... 5; 5.5; 6; 8 V (+15% -33%) ^a
2nd LV Pulse Width	0.03; 0.06 ms ($\pm 10 \mu$ s); 0.1; 0.2; 0.3; 0.4 $\diamond$... 1.5 ms ($\pm 25 \mu$ s)
2nd LV Pace Polarity	LV1 to LV2; LV1 to LV3; LV1 to LV4; LV1 to Can; LV2 to LV1; LV2 to LV3; LV2 to LV4; LV2 to Can; LV3 to LV1; LV3 to LV2; LV3 to LV4; LV3 to Can; LV4 to LV1; LV4 to LV2; LV4 to LV3; LV4 to Can

^a When 2nd LV Amplitude is 8 V, 2nd LV Pulse Width must be less than 1.3 ms

CRT/MPP pacing parameters

Parameter	Programmable values
AdaptivCRT™	Adaptive Bi-V and LV $\diamond$; Adaptive Bi-V; Nonadaptive CRT
V. Pacing	RV; RV→LV; LV→RV $\diamond$; LV
V-V Pace Delay	Auto $\diamond$; 0; 10 ... 80 ms
EffectivCRT™ During AF	On $\diamond$; Off
Maximum Rate	80; 85 ... 110 $\diamond$... 130 min ⁻¹
MPP	On; Off $\diamond$
LV-LV Pace Delay	0 $\diamond$; 10 ... 80 ms
V. Sense Response	On $\diamond$; Off
Maximum Rate	95; 100 ... 130 $\diamond$... 150 min ⁻¹
Atrial Tracking Recovery	On $\diamond$; Off

^a When LV Amplitude is 8 V, LV Pulse Width must be less than 1.3 ms.

Atrial Capture Management™ parameters

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

RV Capture Management™ parameters

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

LV Capture Management™ parameters

Parameter	Programmable values
LV Capture Management™	Adaptive ; Monitor; Off
LV Amplitude Safety Margin	+Auto ; +0.5; +1.0; +1.5; +2.0; +2.5 V
LV Maximum Adapted Amplitude	0.5; 0.75 ... 5.0; 5.5; 6 V

2nd LV Capture Management™ parameters

Parameter	Programmable values
2nd LV Capture Management™	Adaptive ; Monitor; Off
2nd LV Amplitude Safety Margin	+Auto ; +0.5; +1.0; +1.5; +2.0; +2.5 V
2nd LV Maximum Adapted Amplitude	0.5; 0.75 ... 5.0; 5.5; 6 V

Blanking periods

Parameter	Programmable values
PVAB Interval	10 ^a ; 20 ... 100; 110; 120 ... 150 ... 300 ms
PVAB Method	Partial ; Partial+; Absolute
A. Blank Post AP	150; 160 ... 200 ... 250 ms (± 5 ms)
A. Blank Post AS	100 ; 110 ... 170 ms (± 2 ms)
V. Blank Post VP	150; 160 ... 230 ... 320 ms (± 5 ms)
V. Blank Post VS	120 ; 130 ... 170; 200; 220; 250; 280; 300; 320 ms (± 2 ms)

^a If the PVAB Method is set to Partial, the minimum selectable value for the PVAB Interval is 100 ms.

Rate response pacing parameters

Parameter	Programmable values
Rates	
ADL Rate	60; 65 ... 95 ... 170 min ⁻¹ (± 2 min ⁻¹)
Upper Sensor	80; 85 ... 120 ... 175 min ⁻¹ (± 2 min ⁻¹)
Rate Profile Optimisation	On ; Off
Adjust Rate Response	
ADL Response	1; 2; 3 ; 4; 5
Exertion Response	1; 2; 3 ; 4; 5
Additional Parameters	
Activity Threshold	Low ; Medium Low; Medium High; High
Activity Acceleration	15; 30 ; 60 s
Activity Deceleration	Exercise ; 2.5; 5; 10 min
ADL Set Point	5; 6 ... 40; 42 ... 80
UR Set Point	15; 16 ... 40; 42 ... 80; 85 ... 180

Rate adaptive AV parameters

Parameter	Programmable values
Rate Adaptive AV ^a	On ; Off
Start Rate	50; 55 ... 90 ... 145 min ⁻¹
Stop Rate	55; 60 ... 130 ... 175 min ⁻¹

Minimum Paced AV	30; 40 ... 100 ... 200 ms
Minimum Sensed AV	30; 40 ... 70 ... 200 ms

^a If CRT is adaptive, Rate Adaptive AV cannot be selected or programmed.

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%

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

Rate drop response parameters

Parameter	Programmable values
Rate drop response ^a	On; Off
Detection Type	Drop ; Low Rate; Both
Drop Detection	
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
Low Rate Detection	
Detection Beats	1; 2; 3 beats
Intervention	
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

Additional pacing features

Parameter	Programmable values
PMT Intervention	On  ; Off
PVC Response	On  ; Off
V. Safety Pacing ^a	On  ; Off

^a Delivered as LV pacing when LV pacing is permanently programmed or the AdaptivCRT™ operating value is LV. Delivered as RV pacing when RV only pacing is permanently programmed. Otherwise, delivered as BiV pacing.

Longevity

Projected service life in years, with AdaptivCRT™ programmed to Adaptive BiV and LV

Percent Pacing			500 Ω pacing impedance		600 Ω pacing impedance	
Atrial %	RV%	LV%	2.5 V	3.5 V	2.5 V	3.5 V
0%	50%	100%	10.8	8.6	11.2	9.1
15%	50%	100%	10.5	8.2	11.0	8.8
50%	50%	100%	9.9	7.5	10.4	8.1
100%	50%	100%	9.2	6.7	9.7	7.3

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

IMPORTANT REMINDER

See the MRI SureScan™ technical manual before performing an MRI scan and the device manual for detailed information regarding the instructions for use, the implant procedure, indications, contraindications, warnings, precautions, and potential adverse events. For further information, contact your local Medtronic representative or consult the Medtronic website at medtronic.com.

INDICATIONS, SAFETY, AND WARNINGS

See the device manual at manuals.medtronic.com for detailed information regarding the implant procedure, indications, contraindications, warnings, precautions, and potential adverse events.



www.medtronic.com/manuals

Consult instructions for use at this website. Manuals can be viewed using a current version of any major Internet browser. For best results, use Adobe Acrobat Reader® with the browser.

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