



## **CARDIAC RESYNCHRONIZATION THERAPY PACEMAKER (CRT-P)**

### **TECHNICAL SPECIFICATIONS**

## Programmable Parameters

Basic Parameters	
Mode	<b>DDD</b> - DDDR - DDD/DDIR - SafeR - SafeRR - SafeR/DDIR - Dplus - Dplus R - Dplus/DDIR - DDTA - DDTV - DDTAV - VDD - VDDR - DDI - DDIR - DOO - <u>VVI</u> - VVIR - VVT - VOO - AAI - AAIR - AAT - AOO - OOO
Basic rate	30 - 40 - 45 - 50 - 55 - <b>60</b> - 65 - <u>70</u> - 75 - 80 - 85 - 90 - 95 min <sup>-1</sup>
Rest rate	50 - 55 - 60 - 65 - 70 - 75 - 80 - 85 - 90 - 95 min <sup>-1</sup>
Maximum tracking rate	100 - 110 - <b>120</b> - 130 - 140 - 155 - 165 - 175 - 185 min <sup>-1</sup>
Rate hysteresis	<b>0</b> - 5 - 10 - 20 - 35 %
Rest AV delay	30 - 45 - 65 - 80 - 95 - 110 - <b>125</b> - 140 - 155 - 170 - 190 - 205 - 220 - 235 - 250 ms
Exercise AV delay	30 - 45 - 65 - <b>80</b> - 95 - 110 - 125 - 140 - 155 - 170 - 190 - 205 - 220 - 235 - 250 ms
AVD paced/sensed offset	0 - 15 - 30 - 45 - <b>65</b> - 80 - 95 - 110 - 125 ms
Pacing and Sensing Parameters	
Atrial amplitude	1.5 - 2.0 - 2.5 - 3.0 - <b>3.5</b> - 4.0 - <u>5.0</u> - 7.5 V
Atrial pulse width	0.1 - 0.25 - <b>0.35</b> - <u>0.5</u> - 0.6 - 0.75 - 0.85 - 1 ms
Atrial pacing polarity	Unipolar - Bipolar <sup>(1)</sup>
Atrial sensitivity	0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - <b>1.0</b> - 1.2 - 1.5 - 1.8 - 2.0 - 2.2 - 2.5 - 2.7 - 3.0 - 3.5 - 4.0 - 4.5 - 5.0 - 6.0 mV
Atrial sensing polarity	Unipolar - Bipolar <sup>(1)</sup>
Right ventricular amplitude	1.5 - 2.0 - 2.5 - 3.0 - <b>3.5</b> - 4.0 - <u>5.0</u> - 7.5 V
Right ventricular pulse width	0.1 - 0.25 - <b>0.35</b> - <u>0.5</u> - 0.6 - 0.75 - 0.85 - 1 ms
Right ventricular pacing polarity	Unipolar - Bipolar <sup>(1)</sup>
Right ventricular sensitivity	1.0 - 1.2 - 1.5 - 1.8 - 2.0 - <u>2.2</u> - <b>2.5</b> - 2.7 - 3.0 - 3.5 - 4.0 - 4.5 - 5.0 - 6.0 - 8.0 - 10.0 - 15.0 mV
Right ventricular sensing polarity	Unipolar - Bipolar <sup>(1)</sup>
Left ventricular amplitude	0.25 - 0.5 - 0.75 - 1 - 1.25 - 1.5 - 1.75 - 2 - 2.25 - 2.5 - 2.75 - 3 - 3.25 - <b>3.5</b> - 3.75 - 4 - 4.25 - 4.5 - <u>5.0</u> - 7.5 V
Left ventricular pulse width	0.1 - 0.25 - <b>0.35</b> - <u>0.5</u> - 0.6 - 0.75 - 0.85 - 1 ms
Left ventricular pacing polarity	<b>Bipolar (LVtip to LVring)</b> - LVtip to RVring - LVring to RVring - Unipolar (LV tip to CAN)
V chambers	Right - Left - <b>R+L</b> - L+R
VV delay	<b>0</b> - 8 - 16 - 24 - 32 - 40 - 48 - 56 - 64 ms
Atrial lead polarity switch	ON - <b>OFF</b>
Right ventricular lead polarity switch	ON - <b>OFF</b>
Left ventricular lead polarity switch	ON - <b>OFF</b>
Special Features	
Rate smoothing	<b>OFF</b> - Very slow - Slow - Medium - Fast
Acceleration	0 - 5 - 15 - 25 - 35 - 45 %
AV delay shortening	0 - 15 - 30 - 45 - 65 - 80 - 95 - 110 ms
Fallback Mode Switching (FMS)	<b>ON</b> - OFF
Mode switch rate	From 30 to 90 by steps of 5; <b>60</b> min <sup>-1</sup>
Anti-PMT protection	<b>Termin</b> - Reprog - OFF
Atrial autosensing	Auto - <b>Monitor</b>
Right ventricular autosensing	Auto - <b>Monitor</b>
Atrial autothreshold	Auto - Monitor - <b>OFF</b>
Min. atrial amplitude	1.0 - <b>1.5</b> - 2.0 - 2.5 V
Safety atrial amplitude	2.5 - <b>3.5</b> - 4.0 - 5.0V
Atrial autothreshold max rate	75 - 80 - 85 - 90 - 95 - <b>100</b> - 110 min <sup>-1</sup>
Right ventricular autothreshold	Auto - Monitor - <b>OFF</b>
Min. right ventricular amplitude	1.5 - 2.0 - <b>2.5</b> - 3.0 - 3.5 V
Post Ventricular Atrial Blanking (PVAB)	<b>150</b> - 165 - 180 - 195 - 210 - 225 - 240 - 255 ms
Atrial Arrhythmia Prevention Parameters	
Pause suppression	A - V - A+V - <b>OFF</b>
PAC acceleration	ON - <b>OFF</b>
Overdrive	ON - <b>OFF</b>
Max. overdrive rate	100 - 110 - 130 - 155 - 185 min <sup>-1</sup>
Rate-Response Parameters	
Sensor choice	<b>Twin Trace</b> - MV - G
Rate response mode	Learn <sup>(2)</sup> - RRAuto - RRFixed - <b>NO</b>
Physical activity	Very low - Low - <b>Medium</b> - High - Very high
SafeR™ Parameters	
Pause (max.)	2 - <b>3</b> - 4 s
Long PR (max.)	250 - 300 - <b>350</b> - 400 - 450 ms
Long PR (min.)	200 - <b>250</b> - 300 - 350 - 400 - 450 ms
AVB I switch	<b>Rest+Exercise</b> - Exercise
Automatic Detection of Implantation	
Atrial pacing polarity	<b>Unipolar</b> - Bipolar
Right ventricular pacing polarity	<b>Unipolar</b> - Bipolar
Sleep Apnea Monitoring (SAM)	
Monitoring	ON - <b>OFF</b> <sup>(3)</sup>
Monitoring period	22:00-03:00 - 23:00-04:00 - <b>00:00-05:00</b> - 01:00-06:00

**Non Programmable Parameters**

Committed period	95 ms
Rate limit	195 min <sup>-1</sup>
Refractory periods	Dynamic

**Follow-Up Functions**

Implant data	Detailed patient, device and lead information
Battery status	Magnet rate; battery impedance; battery curve
Atrial, right ventricular and left ventricular leads Impedance	Automatic every 6 hours
Atrial, right ventricular and left ventricular pacing threshold tests	Simultaneous transmission of EGM and markers
Temporary programming	Automatic measurement of P and R amplitudes: simultaneous transmission of EGM and markers
Test assistant Smartcheck	Chained test sequence with automatic saving/printing of results
NIPS (Electrophysiologic studies)	A burst, extra-stimuli sequences
Implant and follow-up report	Available in paper print and electronic format (Adobe® PDF)

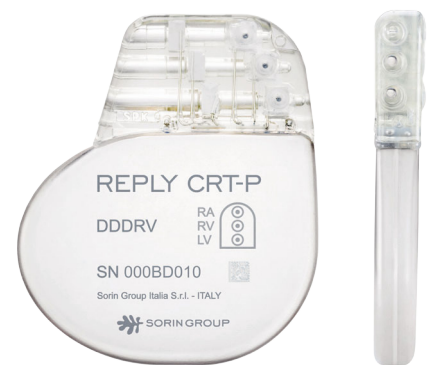
**Diagnostics AIDA** (*Automatic Interpretation for Diagnosis Assistance*)

All Diagnostics	Always ON
EGM	11 min. atrial and right ventricular channels, 22 stored episodes, annotated markers, synchronized with EGM
EGM Triggers	Mode switching; atrial bursts; ventricular bursts; switches in SafeR mode (AVB I, II, III and pauses)
AV Conduction	Full statistics: - PR intervals distribution - AVB episodes history: AVB I, II, III and pauses; SafeR switch criteria: duration and number of episodes - Occurrence of AVB: night/day; rest/exercise
Histograms and curves	A & V rate and pacing %; atrial arrhythmias (number and time in mode switch, bursts, Premature Atrial Contractions (PACs)); ventricular bursts and Premature Ventricular Contractions (PVCs); pacing threshold follow-up; autosensing histograms of P & R wave amplitudes; lead measurements; V & A autothreshold curves; 7 days 24-hour heart rate curve; 6-month data
Sleep Apnea Monitoring (SAM)	Respiratory Disturbance Index; number and duration of events; 6-month trend data; correlated with time in AF

As-shipped values shown **in bold**. Nominal values are underlined.

**Physical and Electrical Characteristics**

Dimensions	45.6 x 52.8 x 6.3 mm
Weight	26.5 g
Volume	11.3 cm <sup>3</sup>
Connector	3*IS-1
Sensors	Minute Ventilation (MV) and Accelerometer (G)
Battery type	GB8426 Lithium Iodine
Longevity	<b>8.0 years:</b> DDDR, 60 min <sup>-1</sup> . Pacing amplitude: A=RV=2.5 V, LV= 3.0 V, 0.35 ms, 500 Ohms, EGMs & Diagnostics ON, MV sensor ON. Pacing percentage A=15%, RV=LV=100%
	<b>8.2 years:</b> DDDR, 60 min <sup>-1</sup> . Pacing amplitude: A=RV=2.5 V, LV= 3.0 V, 0.35 ms, 600 Ohms, EGMs & Diagnostics ON, sensors ON. Pacing percentage A=15%, RV=LV=100%
	<b>7.6 years:</b> DDDR, 60 min <sup>-1</sup> . Pacing amplitude: A=RV=2.5 V, LV= 3.5 V, 0.35 ms, 500 Ohms, EGMs & Diagnostics ON, MV sensor ON. Pacing percentage A=15%, RV=LV=100%
Magnet rate (BOS / RRT)	96 min <sup>-1</sup> / 80 min <sup>-1</sup>



- (1) As soon as the detection of implant is confirmed, the lead configuration is automatically programmed to unipolar pacing and bipolar sensing (if a bipolar lead is used) or to bipolar pacing and bipolar sensing (if the values are re-programmed to bipolar in the box and a bipolar lead is used).
- (2) 20 minutes after implant, rate response will be programmed to Learn, and Diagnostics will be ON.
- (3) Automatic activation at first interrogation after automatic implantation detection.

Not available for distribution or sale in the USA.



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