

Claims

1. Implantable medical device for stimulating a human or animal heart, comprising a first processor, a first memory unit, a stimulation unit configured to stimulate a cardiac region of a human or animal heart (5), a detection unit configured to detect an electrical signal at the cardiac region of the same heart (5), and a first electrode lead port (2) for receiving an electrode lead,

characterized

in that the first electrode lead port (5) comprises a first marking element and a second marking element,

wherein the first marking element indicates a first possible kind of electrode lead that can be received by the first electrode lead port (2) and for an operation of which the first electrode lead port (2) is designed to be configured, wherein the first possible kind of electrode lead is a His bundle electrode lead (8),

wherein the second marking element indicates a second possible kind of electrode lead that can be received by the first electrode lead port (2) and for an operation of which the first electrode lead port (2) is designed to be configured, wherein the second possible kind of electrode lead is chosen from the group consisting of an atrial electrode lead (3), a right ventricular electrode lead (6), and a left ventricular electrode lead (11).

2. Implantable medical device according to claim 1, **characterized** in that the first memory unit comprises a first computer-readable program that causes the first processor to perform the following steps when executed on the first processor: a) retrieving or receiving a dataset indicating whether an electrode lead of the first possible kind of electrode lead (8) or an electrode lead of the second possible kind of electrode lead (3, 6, 11) is connected to the first electrode lead port (2); b) operating the first electrode lead port (2) with stimulation and/or sensing parameters being

specifically adapted for His bundle pacing if an electrode lead of the first possible kind of electrode lead (8) is connected to the first electrode lead port (2) or operating the first electrode lead port (2) with stimulation and/or sensing parameters being appropriate for conventional cardiac pacing if an electrode lead of the second possible kind of electrode lead (3, 6, 11) is connected to the first electrode lead port (2).

3. Implantable medical device according to claim 1 or 2, **characterized** in that the first electrode lead port (2) comprises a third marking element, wherein the third marking element indicates a third possible kind of electrode lead that can be received by the first electrode lead port (2) and for an operation of which the first electrode lead port (2) is designed to be configured, wherein the third possible kind of electrode lead is chosen from the group consisting of an atrial electrode lead (3), a right ventricular electrode lead (6), and a left ventricular electrode lead (11).

4. Implantable medical device according to claim 3, **characterized** in that the second possible kind of electrode lead is an atrial electrode lead (3) and in that the third possible kind of electrode lead is a right ventricular electrode lead (6).

5. Implantable medical device according to any of the preceding claims 1 to 3, **characterized** in that the second possible kind of electrode lead is a right ventricular electrode lead (6).

6. Implantable medical device according to claim 5, **characterized** in that the implantable medical device (1, 10, 100, 1000) comprises a second electrode lead port (20), wherein the second electrode lead port (20) comprises a fourth marking element, wherein the fourth marking element indicates a fourth possible kind of electrode lead that can be received by the second electrode lead port (20) and for an operation of which the second electrode lead port (20) is designed to be configured, wherein the fourth possible kind of electrode lead is an atrial electrode lead (3).

7. Implantable medical device according to claim 5 or 6, **characterized** in that the implantable medical device (1, 10, 100, 1000) comprises a third electrode lead port (200), wherein the third electrode lead port (200) comprises a fifth marking element, wherein the fifth marking element indicates a fifth possible kind of electrode lead that can be received by the third electrode lead port (200) and for an operation of which the third electrode lead port (200) is designed to be configured, wherein the fifth possible kind of electrode lead is a left ventricular electrode lead (11).
8. Implantable medical device according to claim 7, **characterized** in that the third electrode lead port (200) also comprises a sixth marking element, wherein the sixth marking element indicates a sixth possible kind of electrode lead that can be received by the third electrode lead port (200) and for an operation of which the third electrode lead port (200) is designed to be configured, wherein the sixth possible kind of electrode lead is a right ventricular backup electrode lead (6).
9. Arrangement comprising an implantable medical device according to any of the preceding claims and a programming device for programming the implantable medical device (1, 10, 100, 1000).
10. Arrangement according to claim 9, **characterized** in that the programming device comprises a second processor and a second memory unit, wherein the second memory unit comprises a second computer-readable program that causes the second processor to perform the following steps when executed on the second processor: a) allowing to select one of at least two electrode lead configurations of the implantable medical device (1, 10, 100, 1000), wherein the at least two electrode lead configurations comprise a first electrode lead configuration in which no His bundle electrode lead is connected to the implantable medical device (1, 10, 100, 1000) and a second electrode lead configuration in which a His bundle electrode lead (8) is connected to a first electrode lead port (2) of the implantable medical device (1, 10, 100, 1000); b) if the first electrode lead configuration is selected, setting at least one sensing and/or stimulation parameter of the first electrode lead port (2) to a value appropriate for conventional cardiac pacing; if the second electrode lead

configuration is selected, setting at least one sensing and/or stimulation parameter of the first electrode lead port (2) to a value appropriate for His bundle pacing and differing from a value of the same sensing and/or stimulation parameter appropriate for conventional cardiac pacing.

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11. Arrangement according to claim 9 or 10, **characterized** in that the programming device comprises a second processor and a second memory unit, wherein the second memory unit comprises a second computer-readable program that causes the second processor to perform the following steps when executed on the second processor: a) allowing to select one of at least two electrode lead configurations of the implantable medical device (1, 10, 100, 1000), wherein the at least two electrode lead configurations comprise a first electrode lead configuration in which no His bundle electrode lead is connected to the implantable medical device (1, 10, 100, 1000) and a second electrode configuration in which a His bundle electrode lead (8) is connected to a first electrode port (2) of the implantable medical device (1, 10, 100, 1000); and b) transmitting a dataset to the implantable medical device (1, 10, 100, 1000), the dataset indicating whether the first electrode lead configuration or the second electrode lead configuration is selected.
12. Arrangement according to any of claims 9 to 11, **characterized** in that the second electrode lead configuration comprises the following setting: a) the implantable medical device (1) comprises a single electrode lead port, namely the first electrode lead port (2); and b) a His bundle electrode lead (8) is connected to the first electrode lead port (2).
13. Arrangement according to any of claims 9 to 11, **characterized** in that the second electrode lead configuration comprises the following setting: a) the implantable medical device (10) comprises exactly two electrode lead ports, namely the first electrode lead port (2) and a second electrode lead port (20); and b) a His bundle electrode lead (8) is connected to the first electrode lead port (2) and a right atrial electrode lead (3) is connected to the second electrode lead port (20).

14. Arrangement according to any of claims 9 to 11, **characterized** in that the second electrode lead configuration comprises one of the following settings: a) the implantable medical device (100, 1000) comprises exactly three electrode lead ports, namely the first electrode lead port (2), a second electrode lead port (20), and a third electrode lead port (200); and b) i) a His bundle electrode lead (8) is connected to the first electrode lead port (2), no electrode lead is connected to the second electrode lead port (20), and a right ventricular electrode lead (6) is connected to the third electrode lead port (200); or ii) a His bundle electrode lead (8) is connected to the first electrode lead port (2), a right atrial electrode lead (3) is connected to the second electrode lead port (20), and a right ventricular electrode lead (6) is connected to the third electrode lead port (200); or iii) a His bundle electrode lead (8) is connected to the first electrode lead port (2), a right atrial electrode lead (6) is connected to the second electrode lead port (20), and a left ventricular electrode lead (11) is connected to the third electrode lead port (200).
15. Method for programming an implantable medical device according to any of claims 1 to 8 with a programming device, wherein the implantable medical device (1, 10, 100, 1000) comprises a first data communication unit, wherein the programming device comprises a second data communication unit, the method comprising the following steps:
- a) selecting, with the programming device, one of at least two electrode lead configurations of the implantable medical device (1, 10, 100, 1000), wherein the at least two electrode lead configurations comprise a first electrode lead configuration in which no His bundle electrode lead is connected to the implantable medical device (1, 10, 100, 1000) and a second electrode configuration in which a His bundle electrode lead (8) is connected to a first electrode port (2) of the implantable medical device (1, 10, 100, 1000);
- b) generating, with the programming device, a dataset for an electrode lead configuration selected on the programming device comprising one or more of i) an appropriate sensing parameter and/or stimulation parameter, ii) appropriate

pacing time settings for treating brachycardia, iii) parameters to provide a well-matched device feature set and iv) parameters to ensure a proper and safe patient support in all possible device operating modes and conditions. ;

- 5 c) transmitting, with the second data communication unit, the dataset to the implantable medical device (1, 10, 100, 1000);
- d) receiving, with the first data communication unit, the dataset;
- 10 e) setting a sensing parameter of the detection unit and/or a stimulation parameter of the stimulation unit by using the received dataset.