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0. Change History

Version 1.0: Initial document.

Version 2-0: Final version before CDMS-freeze for interim analysis;
implementation of new internal adjudication dataset;
implementation of findings during blind review (spurious implantation date);
routine document improvements and corrections.

1. Introduction

1.1. Aim

The aim of this document is to provide detailed instructions on all descriptive and inferential statistical analyses for the Clinical Investigation Report (CIR). Inferential analyses of the primary and secondary endpoint(s) as defined in this document are mandatory to be reported in the CIR.

1.2. General information

The text contains verbatim excerpts from the CIP. Such excerpts are italicized with grey background; e.g.

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The main aspects and the design of the clinical investigation are presented in chapters 1-4.

General statistical procedures are summarized in chapter 5. Those methods are used in case there is no other specification within this document.

Definitions of the specific dates, e.g. enrollment and termination are presented in chapter 6.

Specific analysis sets are defined in chapter 7.

Descriptive and inferential statistical analyses are handled in following chapters.

Thereby the following statistical considerations are specified:

- Definition of the analysis set for the following analyses, e.g. excluding patients without any measured or imputed data for this endpoint.
- Definition of the endpoint(s) to be analyzed including references to the source data, e.g. CRF sheet and item.
- Treatment of missing and spurious data for evaluation of the above endpoint(s).
- Exclusion of particular information from the evaluation of the above endpoint(s) in addition to the exclusion of patients from the analysis set.
- Descriptive analyses including tables and figures
- Statistical alternative hypothesis/hypotheses (HA) to analyze the above endpoint(s) if available.
- Statistical tests intended to analyze the above hypothesis/hypotheses if available.

All variables are defined in tables using the following columns:

- Data file — Name of a data file exported from the CDMS with one data row per unique identifier (e.g. patient-specific "patient display ID full" or event-specific record ID); additionally, a new data file ("data SAR") might be generated by merging all relevant data from the original CDMS data files and generating derived variables (e.g. BMI from weight and height or date of first AE episode)
- Notes — Information whether data has to be presented with "descriptive" methods as defined in the following sub-chapter, data for "case listings" of original data for each patient specified, or "no report" for data needed for generating of derived variables only
- Variable name — Original name of a variable in the CDMS data file or name of a derived variables (indicated with a suffix " SAR");
- Variable label — Original labels from the CDMS data will be used for generating the SAR unless a new label is defined in this document ("NEW"); labels might be omitted or shortened ("…") if remaining clear
- Variable level — Nominal, ordinal, scale (metric, continuous), or date
- Nominal values — Original values from CDMS data will be used for generating the SAR unless new nominal values are defined in this document ("NEW"); values might be omitted or shortened ("…") if remaining clear; for numeric data this information is not applicable (n.a.)

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values

2. Objectives

CIP chapter 7.1 Objectives

This study is designed as a pre-market clinical study to provide evidence on the safety, performance and usability of the Renamic Neo programmer hardware, software and ECG cable PK-222-L to support regulatory approval, with a focus on requirements of the European Medical Device Regulation (MDR). The study is also intended to identify and evaluate residual risks associated with the use of the Renamic Neo programmer system that remained unrevealed even after risk analysis, risk mitigation and completed validation of the device. The results will be used to update the clinical evaluation of the devices.

3. Investigational Device

CIP chapter 4.7.1 Renamic Neo hardware and software

The Renamic Neo programmer system comprises the Renamic Neo hardware, software and the ECG cable PK-222-L. The functional design is highly similar to the predecessor Renamic. Some software features related to PSA functionalities and the graphical user interface (GUI) have been optimized and are described below. The hardware consists of the Renamic Neo, the programmer head (PGH), the battery and the pacing system analyzer (PSA). Several accessories can be used with the programmer to record ECG or to conduct lead positioning checks during implantations. These include ECG cables, patient cables, electrode clips and patient adapters.

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4. Study Design & Time Course

CIP chapter

Patients will be enrolled either for implantation including subsequent pre-hospital discharge or for a follow-up visit only. ICM patients will be included for follow-ups only. As the total study duration is planned for only 3 months different patients will be included for implantation and for follow-up. Patients that have been enrolled in the study and were terminated shall not be included a second time in the study.

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Table 3: Overview of study procedures

Investigations	Enrollment / Baseline	For patients enrolled before implantation		For patients enrolled after implantation
		Implantation	Pre-hospital discharge	Follow-up
Patient informed consent	x			
Verification of in- and exclusion criteria	x			
Demographics and medical history	x			
Information on implanted IPG, ICD, CRT or ICM, leads (device log)	x*	x		
PSA measurements and evaluation		x		
Device based measurements and evaluation, if applicable		x	x	x
Evaluation of implant interrogation and programming functionality		x	x	x
General assessment of Renamic Neo hardware and software		x	x	x
Evaluation of usability of Renamic Neo system		x	x	x
Data export (connectivity, printing)		x	x	x
Data export of use case data for evaluation at sponsor		x	x	x
Used accessories (including entry in device log)		x	x	x
Battery usage		x	x	x
Adverse event and device deficiency reporting	x	x	x	x
Concomitant medication	x[1]	x[1]	x[1]	x[1]
Regular termination			x	x

x point in time of study procedure depends if patient is enrolled for implantation use case (includes PHD) or for follow-up use case.

x* point in time for follow-up cases

x[1] only if related to an AE

5. General Statistical Procedures

5.1. Descriptive analyses

CIP chapter 11.1 Statistical design, method and analytical procedures

For continuous variables descriptive statistics (mean, standard deviation, median, quartiles, minimum, and maximum) will be calculated. For nominal and ordinal variables absolute and relative frequencies will be calculated based on non-missing data. Ordinal variables are described similar as continuous data (minimum, median, quartiles, and maximum) or by absolute and relative frequencies based on non-missing data of each category. Further details will be provided in the separate Statistical Analysis Plan (SAP).

For illustration, see the following standard tables with and without subgroup analyses based on dummy data.

Nominal – dichotomous data

Variable (N total = 10)	Category	N non-missing	Absolute frequency	Relative frequency [%]
Gender	Female	9	3	33.3
History of atrial fibrillation	Yes	8	4	50.0

Variable (N total = 10)	Category	Group Type of implanted device	N non-missing	Absolute frequency	Relative frequency [%]
Gender	Female	ICD (N group = 4)	4	1	25.0
		CRT (N group = 4)	4	2	50.0
		All	9	3	33.3
History of atrial fibrillation	Yes	ICD	4	2	50.0
		CRT	4	2	50.0
		All	8	4	50.0

Nominal data – more than two categories

Variable (N total = 10)	N non-missing	I N(%)	II N(%)	II N(%)	IV N(%)
NYHA class	8	1 (12.5%)	3 (37.5%)	3 (37.5%)	1 (12.5%)

Variable (N total = 10)	Group Type of implanted device	N non-missing	I N(%)	II N(%)	II N(%)	IV N(%)
NYHA Class	ICD (N group = 4)	3	0 (0.0%)	1 (33.3%)	2 (66.7%)	0 (0.0%)
	CRT (N group = 4)	4	1 (25.0%)	1 (25.0%)	1 (25.0%)	1 (25.0%)
	All	8	1 (12.5%)	3 (37.5%)	3 (37.5%)	1 (12.5%)

Scale / metric data

Variable (N total = 10)	N non-missing	Mean	SD	Min	Lower quartile	Median	Upper quartile	Max
Age [years]	9	56.1	15.9	25.0	50.0	60.0	66.0	77.0
Weight [kg]	8	78.5	13.9	55.0	69.5	78.5	89.0	99.0

Variable (N total = 10)	Group Type of implanted device	N non-missing	Mean	SD	Min	Lower quartile	Median	Upper quartile	Max
Age [years]	ICD (N group = 4)	4	61.8	11.2	50.0	55.0	60.0	68.5	77.0
	CRT (N group = 4)	4	50.3	21.5	25.0	32.5	53.0	68.0	70.0
	All	9	56.1	15.9	25.0	50.0	60.0	66.0	77.0
Weight [kg]	ICD	3	85.0	7.0	77.0	77.0	88.0	90.0	90.0
	CRT	4	76.0	18.5	55.0	62.5	75.0	89.5	99.0
	All	8	78.5	13.9	55.0	69.5	78.5	89.0	99.0

Ordinal data

Identical tables as for metric data but without mean and SD

5.2. Inferential analyses

CIP chapter 11.3 Level of significance and the power of the study

Because there are no pre-specified hypotheses, all analyses will be exploratory.

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5.3. Significance level

CIP chapter 11.3 Level of significance and the power of the study

Because there are no pre-specified hypotheses, all analyses will be exploratory. For inferential analyses, a two-sided p-value less than 5% will be considered statistically significant. In accordance to the exploratory approach there will be no adjustment for multiplicity.

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5.4. Missing Data

CIP chapter 11.11 Handling of missing, unused and spurious data

For the endpoints, missing data will not be imputed.

Free text will be used to clarify other data.

Spurious data will be clarified via the query management system, i.e. corrected after approval of an investigator. Remaining outliers will be identified during the review of the data before CDMS closure. In case of a clear evidence of a measurement error, the Statistical Analysis Plan will be updated in order to avoid any bias. Spurious data, which were not clarified by the query process before CDMS freeze or closure, will be indicated. If appropriate, analyses will be performed both with/without such data.

5.5. Exclusion of data from confirmatory data analysis

CIP chapter 11.12 Exclusion of data from the confirmatory data analysis

No data are documented or analyzed from patients without documented informed consent.

5.6. Subgroups

CIP chapter 11.9 Specification of subgroups

Potential critical events will be analyzed whether there is any connection to the subgroups IPG, ICD, CRT, or ICM.

5.7. Interim analyses

CIP chapter 11.6 Provision for an interim analysis

There is one planned interim analyses for internal purposes. Except for safety reasons no investigator is informed about the results and, thus, no bias is expected. There will be no adjustment for multiplicity.

5.8. Software

All analyses will be carried out using validated software, e.g. SAS version 9.4 or upgrades.

5.9. CDMS export

Datasets to be analyzed based on this SAP

Dataset name	Data rows, unique identifier variables except record id	Data rows unique identifier description	Parent CRF In case of embedded log	Notes
enrollment	patient display id full	Patient	n.a.	
baseline	patient display id full	Patient	n.a.	
Medical history	patient display id full	Patient	n.a.	
implantation psa	patient display id full	Patient	n.a.	
general assessments	patient display id full & autom SVTYP	Patient & visit type	n.a.	Visit type: Implantation, pre-hospital discharge follow-up (PHD), regular follow-up after PHD
accessory log details	patient display id full & SVTYP & helpvar model & DIPRGSNR	Patient & visit type & model & programmer serial no.	n.a.	Accessories: Renamic Neo programmer, ECG cable, electrode clip, patient cable, patient adapter
device log details	patient display id full & DIDVTYP	Patient & device type	n.a.	Device type: Pacemaker (single/dual chamber), ICD (single/dual chamber) CRT-P device, CRT-D device, ICM (Insertable Cardiac Monitor) RA lead, RV lead LV lead, VCS lead
adverse event	n.a.	Event	n.a.	
internal adjudication	n.a.	Event	n.a.	
device deficiency	n.a.	Event	n.a.	Investigational device: Renamic Neo Programmer, Renamic Neo Programmer Software, PK-222-L ECG cable
study termination	patient display id full	Patient	n.a.	

Other Datasets

Dataset name	Data rows, unique identifier variables except record id	Data rows unique identifier description	Parent CRF in case of embedded log	Notes
hospitalization log	n.a.	Event	adverse event	
device accountability details	DIDVTYP & DIDVSNR	Device type & device SNR / ID	n.a.	
deviation patient related	DVSPID	Deviation ID	n.a.	
deviation site related	DVSPID	Deviation ID	n.a.	
deviation third party	DVSPID	Deviation ID	n.a.	
concomitant medication log details	patient display id full & CMTRT & CMSTDT	Patient & trade name & start date	n.a.	Documented in case of an adverse event.

6. Specific Study Dates

6.1. Enrollment date

CIP chapter 8.3.6 Point of enrollment and study termination

Point of enrollment is the date of signature of the informed consent form by the patient.

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
enrollment	DMICDT i	Patient dated ICF	date	n.a.
data SAR	date enr SAR = DMICDT i	Patient dated ICF	date	n.a.

6.2. Implantation date

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
Implantation psa	PRIMSTDT i	Date of implantation	date	n.a.
baseline	SVSTDT_i	Date of baseline assessment	date	n.a.
data SAR	date imp SAR[1]	Date of implantation (excluding spurious data)	date	n.a.

6.1. PHD date

Data file, identifier patient display id full & autom SVTYP	Variable name	Variable label	Variable level	Nominal values
general assessments for selection autom SVTYP = Pre-hospital discharge follow-up (PHD)	SVFUSTDT i	Date of follow-up	date	n.a.

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
data SAR	date PHD SAR = SVFUSTDT i	Date of PHD	date	n.a.

6.1. FU date

Data file, identifier patient display id full & autom SVTYP	Variable name	Variable label	Variable level	Nominal values
general assessments for selection autom SVTYP = Regular follow-up after PHD	SVFUSTDT	Date of follow-up	date	n.a.

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
data SAR	date FUP SAR = SVFUSTDT i	Date of regular follow-up after PHD	date	n.a.

6.2. Termination date

CIP chapter 8.3.6 Point of enrollment and study termination

Date of regular termination for each patient is the date of discharge from the index hospitalization for implantation cases or the date of follow-up after follow-up completion for follow-up cases.

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
study termination	DSTRDT	Date of termination	date	n.a.
data SAR	Date ter SAR = DSTRDT i	Date of termination	date	n.a.

[1] IF PRIMSTDT i ≥ SVSTDT_i
THEN date imp SAR[1] = PRIMSTDT i
ELSE date imp SAR -> missing

7. Analysis Sets & Subgroups

7.1. Analysis Sets

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
enrollment	DMSUBSPS	Patient signed the informed consent personally	nominal	o Yes o No
enrollment	DMRPRSPS	An independent witness signed the informed consent since the patient is unable to write	nominal	o Yes o No
study termination	DSDRPPRO	Please specify Drop-out according to protocol	nominal	o No implantation of an active implantable BIOTRONIK device o Other

Data file, identifier patient display id full & autom SVTYP	Variable name	Variable label	Variable level	Nominal values
general assessments	autom SVTYP	Visit type	nominal	o Implantation o Pre-hospital discharge follow-up (PHD) o Regular follow-up after PHD
	PRSVPRG	Was the Renamic Neo programmer used for the visit	nominal	o Yes o No

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
data SAR	analysis set enr SAR[2]	Enrollment analysis set (patients with Biotronik device and usage of Renamic Neo)	nominal	o Yes o No
data SAR	analysis set imp SAR[3]	Implantation analysis set (patients with Biotronik device and usage of Renamic Neo during implantation)	nominal	o Yes o No
data SAR	analysis set PHD FUP SAR[4]	PHD and regular FU analysis set (patients with Biotronik device and usage of Renamic Neo during PHD or FU)	nominal	o Yes o No

The implantation analysis set and the PHD/FUP analysis set are not mutually exclusive, i.e. specific patients can belong to both analysis sets.

[2] IF (DMSUBSPS = Yes OR DMRPRSPS = Yes) AND date enr SAR not missing AND
TIINC01 type ≠ No implantation of an active implantable BIOTRONIK device AND
any general assessments per patient with PRSVPRG = Yes
THEN analysis set enr SAR = Yes
ELSE analysis set enr SAR = No

[3] IF analysis set enr SAR = Yes AND
any general assessments per patient with (PRSVPRG = Yes AND autom SVTYP per patient = Implantation)
THEN analysis set imp SAR = Yes
ELSE analysis set imp SAR = No

[4] IF analysis set enr SAR = Yes AND
any general assessments per patient with
([PRSVPRG = Yes AND autom SVTYP = Pre-hospital discharge follow-up (PHD)] OR
[PRSVPRG = Yes AND autom SVTYP = Regular follow-up after PHD])
THEN analysis set FUP SAR = Yes
ELSE analysis set FUP SAR = No

Subgroups

Data file, identifier patient display id full & DIDVTYP	Variable name	Variable label	Variable level	Nominal values
device log details	helpvar device type	hidden technical field: Short name for General type of device	nominal	o CRT o CRT-P o ICD o ICM o IPG

Data file, identifier patient display id full	Variable name	Variable label	Variable level	Nominal values
data SAR	subgroup device type SAR[5]	Subgroup type of device	nominal	o CRT o CRT-P o ICD o ICM o IPG

[5] Patient-specific type of device data for helpvar device type not missing subgroup device type SAR = helpvar device type

8. Data for a CONSORT diagram and "study realization"

8.1. Analysis set

Unless otherwise specified, all analyses are performed for the enrollment analysis set[6].

8.2. Enrollment

- Date of FPI
- Date of LPI
- Number of patients
- Number of patients per site

Inclusion criteria

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
enrollment	descriptive	TIINC01	Patient is planned for de novo implantation or already has a BIOTRONIK active, implantable device	nominal	○ Yes ○ No
		TIINC02	Patient is able to understand the nature of the study and provides written informed consent	nominal	○ Yes ○ No
		TIINC01 type	Type of inclusion criterion	nominal	○ Patient is planned for de novo implantation ○ Patient has already an implanted device

Exclusion criteria

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
enrollment	descriptive	TIEXC01	Patient is implanted with a Stratos pacemaker	nominal	○ Yes ○ No
		TIEXC02	Patient is pregnant or breastfeeding	nominal	○ Yes ○ No
		TIEXC03	Patient is less than 18 years old	nominal	○ Yes ○ No
		TIEXC04	Patient is planned for implant exchange or upgrade	nominal	○ Yes ○ No

[6] analysis set enr SAR = Yes

8.3. Termination

- Date of FPO
- Date of LPO

Data file: Identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
termination	descriptive	DSRTRM	Regular study termination	nominal	o Yes o No
termination	Descriptive for DSRTRM = No	DSETRREA	Reason for early study termination	nominal	o Patient moved away from investigational center o Patient is lost to follow-up o Patient withdrew consent to study participation o Patient death o Drop-out according to protocol o Enrollment failure

Data file: Identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
enrollment	Case case listing for DSETRREA = Drop-out according to protocol	DMICDT i	Patient: Date of informed consent signature	date	n.a.
termination		DSTRDT i	Date of study termination	date	n.a.
		DSDRPPRO	Reason for early study termination	nominal	o No implantation of an active implantable BIOTRONIK device o Other
		CODRPPRO	Please specify Drop-out according to protocol - Other	text	...

8.4. Fu duration

The FU duration has to be analyzed separately for the implantation[7] and follow-up analysis set[8].

Data file: Identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
data SAR	descriptive and cumulative sum	FU duration SAR[9]	Days from enrollment to termination	scale	n.a

[7] analysis set imp SAR = Yes

[8] analysis set FUP SAR = Yes

[9] FU duration SAR = DSTRDT - DMICDT

8.5. Investigations

The following frequency has to be analyzed for the implantation analysis set [10].

Data file: Identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
data SAR	descriptive	PHD renamicneo SAR[11]	PHD with Renamic Neo	nominal	o Yes o No

The following frequencies have to be analyzed for the PHD/FUP analysis set[12]

Data file: Identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
data SAR	descriptive	PHD renamicneo SAR	PHD with Renamic Neo	nominal	o Yes o No
data SAR	descriptive	FU renamicneo SAR[13]	Fu with Renamic Neo	nominal	o Yes o No

[10] analysis set imp SAR = Yes

[11] If any general assessments per patient with
(PRSVPRG = Yes AND autom SVTYP per patient = Pre-hospital discharge follow-up (PHD))
THEN PHD renamicneo SAR = Yes
ELSE PHD renamicneo SAR = No

[12] analysis set PHD FUP SAR = Yes

[13] If any general assessments per patient with
(PRSVPRG = Yes AND autom SVTYP per patient = Regular follow-up after PHD)
THEN PHD renamicneo SAR = Yes
ELSE PHD renamicneo SAR = No

9. Baseline

CIP chapter 11.12 chapter 7.5 Further data of interest
General information
- *Patient demographics and medical history*

9.1. Analysis set

All analyses are performed for enrollment analysis set[14].

9.2. Variables

Baseline / Demographic data

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
baseline	descriptive	DMSEX	Gender	nominal	o Male o Female
	descriptive	DMAGE	Age [Years]	scale	n.a.
baseline	descriptive	VSHGHT	Height [cm]	scale	n.a.
	descriptive	VSWGHT	Weight [kg]	scale	n.a.
	descriptive	VSBMI	BMI [kg/m2]	scale	n.a.

Medical history / Heart Failure

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
medical history	descriptive	MHHF	History of Heart failure	scale	o Yes o No
	descriptive for MHHF = Yes	CVNYHA	Current NYHA classification	to be reported as nominal variable	o 1 o 2 o 3 o 4

Medical history / Coronary Artery Disease

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
medical history	descriptive	MHCAD	History of coronary artery disease	nominal	o Yes o No
	Descriptive for MHCAD=Yes	MHMI	Prior myocardial infarction	nominal	o Yes o No
		PRRVC	Prior revascularization (PCI or CABG)	nominal	o Yes o No

[14] analysis set enr SAR = Yes

Medical history / Brady- and Tachyarrhythmias

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
medical history	descriptive	MHSSS	History of sick sinus syndrome	nominal	○ Yes ○ No
	descriptive	MHAVB	History of AV block	nominal	○ Yes ○ No
	descriptive for MHAVB =Yes	MHAVBTYP	Type of AV block	to be reported as nominal variable	○ 1 ○ 2 ○ 3
	descriptive	MHBBB	History of bundle branch block	nominal	○ Yes ○ No
	descriptive	MHAFB	History of atrial fibrillation	nominal	○ Yes ○ No
	descriptive for MHAFB = Yes	CVAFBTYP	Type of atrial fibrillation	nominal	○ Paroxysmal ○ Persistent ○ Long-standing persistent ○ Permanent
	descriptive	MHAVA	History of other atrial/supraventricular arrhythmias	nominal	○ Yes ○ No
	descriptive	MHVA	History of ventricular arrhythmias	nominal	○ Yes ○ No

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
medical history	case listing for MHAVA = Yes	COAVA	Specification of other type of atrial/supraventricular tachycardia	text	...
	case listing for MHVA = Yes	COAV	Specification of ventricular arrhythmias	text	...

Medical history / known comorbidities

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
medical history	descriptive	MHHP	Hypertension (including well-controlled)	nominal	○ Yes ○ No
	descriptive	MHVHD	Valvular heart disease	nominal	○ Yes ○ No
	descriptive	MHCVD	History of cerebrovascular disease (e.g. TIA / Stroke)	nominal	○ Yes ○ No
	descriptive	MHPVAD	Peripheral vascular/arterial disease	nominal	○ Yes ○ No
	descriptive	MHASTH	Asthma or other chronic lung disease (except COPD)	nominal	○ Yes ○ No
	descriptive	MHCOPD	Chronic obstructive pulmonary disease (COPD)	nominal	○ Yes ○ No
	descriptive	MHSAP	Sleep apnoea	nominal	○ Yes ○ No
	descriptive	MHLIVR	Chronic liver disease	nominal	○ Yes ○ No
	descriptive	MHDIAM	Diabetes mellitus	nominal	○ Yes ○ No
	descriptive	MHANEM	Anemia	nominal	○ Yes ○ No
	descriptive	MHCNCR	Cancer	nominal	○ Yes ○ No
	descriptive	MHHPLP	Hyperlipidemia	nominal	○ Yes ○ No
	descriptive	MHCMBOTH	Other comorbidities	nominal	○ Yes ○ No

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
medical history	case case listing for MHVHD = Yes	COVHD	Further specification of valvular heart disease (e.g. type, severity)	text	n.a.
	case listing for MHCMBOTH =Yes	COCMBOTH	Specification of other comorbidities	text	n.a.

9.3. Treatment of Missing and Spurious Data

See general definitions in chapter 5.4.

9.4. Exclusion of Particular Information

See general definitions in chapter 5.5.

No data are excluded from the specified analysis set and variables.

9.5. Descriptive Analyses

For specification "Notes = descriptive", see general definitions in chapter 5.1.

9.6. Hypotheses & Statistical Tests

There are no pre-defined statistical hypotheses.

10. ADE and DD Endpoints - Implantation

CIP chapter 7.2.2. Endpoints

In this study the number of adverse device effects and device deficiencies (DD) that occur in patients, users or other persons will be evaluated …

- *Number of adverse device Effects / device deficiencies per number of implantations*
- *Number of adverse device Effects / device deficiencies and per number of follow-up cases*

ADEs will be adjudicated by an internal adjudication board, whereby the seriousness and device relatedness will be re-examined. If any amply documented external physical influence (e.g. accident, general power blackout) or medical AE caused the ADE, it does not contribute to this endpoint.

ADEs and device deficiencies are adjudicated by an internal adjudication board.

10.1. Analysis Set and Data Selection

All analyses are performed for patients in the implantation analysis set using a specific data selection before / at implantation[15] .

10.2. Variables

Adjudicated Adverse Device Effects / Device Deficiencies

Data file, identifier record id	Notes	Variable name	Variable label	Variable Level	Nominal values
internal adjudication	Case listing for AETYP = AE	AETYP	Type of event	nominal	○ AE ○ DD
		AESTDT	Onset date	date	n.a.
		PRUCASE	Related use case	nominal	○ Implementation ○ PHD / Follow-up
		DEIDV	Related investigational device	nominal	○ Renamic Neo programmer ○ ECG cable PK-222-L
		DIPRGSNR	Programmer serial number	text	n.a.
		DIECBID	ESG cable ID	nominal	01, 02, …, 25
		AERELIDV	Adverse Event is related to the investigational device (device related ADE)	nominal	○ Not related ○ Unlikely ○ Possible ○ Probable ○ Causal relationship
		AESER	Adverse Event is serious	nominal	○ Yes ○ No
		AERELSET	Adverse Event is relevant for ADE/DD endpoint	nominal	○ Yes ○ No
		CORELSET	Please specify reson for No	text	n.a.

[15] analysis set imp SAR = Yes and PRUCASE = Implementation

Data file, identifier record id	Notes	Variable name	Variable label	Variable Level	Nominal values
internal adjudication	Case listing for AETYP = DD	AETYP	Type of event	nominal	○ AE ○ DD
		DERCDT	Date of detection	date	n.a.
		PRUCASE	Related use case	nominal	○ Implementation ○ PHD / Follow-up
		DEIDV	Related investigational device	nominal	○ Renamic Neo programmer ○ ECG cable PK-222-L
		DIPRGSNR	Programmer serial number	text	n.a.
		DIECBID	ESG cable ID	nominal	01, 02, …, 25
		DEADEDD	Device dfficiency is relevant for ADE/DD endpoint	nominal	○ Yes ○ No
		COADEDD	Please specify reson for No	text	n.a.

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
data SAR	descriprive	any ade SAR[16]	Any Adverse Device Effect (serious or non-serious) based on internal adjudication	nominal	○ Yes ○ No
data SAR	descriprive	any sade SAR[17]	Any Serious Adverse Device Effect based on internal adjudication	nominal	○ Yes ○ No
data SAR	descriprive	any dd SAR[18]	Any Device Deficiency	nominal	○ Yes ○ No
data SAR	descriprive	any ade dd SAR[19]	Any Adverse Device Effect (serious or non-serious) or Device Deficiency based on internal adjudication	nominal	○ Yes ○ No
data SAR	descriprive	n ade SAR[20]	Number of Adverse Device Effects (serious or non-serious) based on internal adjudication	metric to be reported as nominal	○ 1 ○ 2 ...
data SAR	descriprive	n sade SAR[21]	Number of any Serious Adverse Device Effects based on internal adjudication	metric to be reported as nominal	○ 1 ○ 2 ...
data SAR	descriprive	n dd SAR[22]	Number of any Device Deficiencies based on internal adjudication	metric to be reported as nominal	○ 1 ○ 2 ...
data SAR	descriprive	n ade dd SAR[23]	Number of any Adverse Device Effects (serious or non-serious) and Device Deficiencies based on internal adjudication	metric to be reported as nominal	○ 1 ○ 2 ...

[16] If specific patient with AERELSET = Yes AND AESER = No
THEN any ade SAR = Yes
ELSE any ade SAR = No

[17] If specific patient with AERELSET = Yes AND AESER = Yes
THEN any sade SAR = Yes
ELSE any sade SAR = No

[18] If specific patient with DEADEDD = Yes
THEN any dd SAR = Yes
ELSE any dd SAR = No

[19] If specific patient with AERELSET = Yes OR DEADEDD = Yes
THEN any ade dd AERELSET SAR = Yes
ELSE any ade dd SAR = No

[20] Count number of events per patient with AERELSET = Yes AND AESER = No

[21] Count number of events per patient with AERELSET = Yes AND AESER = Yes

[22] Count number of events per patient with DEADEDD = Yes

[23] Count number of events per patient with AERELSET = Yes OR DEADEDD = Yes

10.3. Treatment of Missing and Spurious Data

See general definitions in chapter 5.4.

10.4. Exclusion of Particular Information

See general definitions in chapter 5.5. No data are excluded from the specified analysis set and variables.

10.5. Descriptive Analyses

For specification "Notes = descriptive", see general definitions in chapter 5.1.

10.6. Hypotheses & Statistical Tests

There are no pre-defined statistical hypotheses.

11. ADE and DD Endpoints – PHD & follow-up

CIP chapter 7.2.2. Endpoints

In this study the number of adverse device effects and device deficiencies (DD) that occur in patients, users or other persons will be evaluated …

- *Number of adverse device Effects / device deficiencies per number of implantations*
- *Number of adverse device Effects / device deficiencies and per number of follow-up cases*

ADEs will be adjudicated by an internal adjudication board, whereby the seriousness and device relatedness will be re-examined. If any amply documented external physical influence (e.g. accident, general power blackout) or medical AE caused the ADE, it does not contribute to this endpoint.

ADEs and device deficiencies are adjudicated by an internal adjudication board.

11.1. Analysis Set and Data Selection

All analyses are performed for patients in the PHD & follow-up analysis set using a specific data selection after implantation[24].

All analyses from chapter 10 ADE and DD Endpoints - Implantation are repeated for these data.

[24] analysis set PHD FUP SAR = Yes and PRUCASE = PHD / Follow-up

12. Implantation & PSA

CIP chapter 7.5 Further data of interest
During implantation and follow-ups additional data on safety, performance and usability of the Renamic Neo system and accessories will be collected.

- *Use and assessment of PSA functionality (sensing, pacing and impedance tests)…*

12.1. Analysis Set

All analyses are performed for patients in the implantation analysis set[25].

12.2. Variables

Used Programmer Features: Pacing System Analyzer (PSA)

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
implantation psa	descriptive	PRIMPSA	Was the PSA functionality used during implantation	nominal	o Yes o No
	descriptive with "not used" handled as missing	QSPLRAS	Polarity selection and documentation	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSPLRSPR	**NEW: Polarity:** Did you notice any problem	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSSAAS	Sensing amplitude	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSSAPRB	**NEW: Sensing amplitude:** Did you notice any problem	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSPTAS	Pacing threshold	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSPRPRB	**NEW: Pacing threshold:** Did you notice any problem	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSPITAS	Impedance test	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSPITPRB	**NEW: Impedance test:** Did you notice any problem	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSPNSAS	Phrenic Nerve Stimulation (PNS) test and documentation	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSPNSPRB	**NEW: PNS test:** Did you notice any problem	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSBSAS	Burst stimulation if performed in routine care	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSBSPRB	**NEW: Burst stimulation:** Did you notice any problem	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected

If preceding variable = "used successfully" then impute missing data with "used successfully".

[25] analysis set imp SAR = Yes

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
implantation psa	case listing for QSPLRAS = used, but not successfully OR QSPLRSPR = Yes, with Adverse Event OR QSPLRSPR = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPLRSPR	**NEW: Polarity amplitude:** Please specify reason for unsuccessful use	text	...
	case listing for QSSAAS = used, but not successfully OR QSSAPRB = Yes, with Adverse Event OR QSSAPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COSAAS	**NEW: Sensing amplitude:** Please specify reason for unsuccessful use	text	...
	case listing for QSPTAS = used, but not successfully OR QSPRPRB = Yes, with Adverse Event OR QSPRPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPTAS	**NEW: Pacing threshold:** Please specify reason for unsuccessful use	text	...
	case listing for QSPITAS = used, but not successfully OR QSPITPRB = Yes, with Adverse Event OR QSPITPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPITAS	**NEW: Impedance test:** Please specify reason for unsuccessful use	text	...
	case listing for QSPNSAS = used, but not successfully OR QSPNSPRB = Yes, with Adverse Event OR QSPNSPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPNSAS	**NEW: PNS test:** Please specify reason for unsuccessful use	text	...
	case listing for QSBSAS= used, but not successfully OR QSBSPRB = Yes, with Adverse Event OR QSBSPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COBSAS	**NEW: Burst stimulation:** Please specify reason for unsuccessful use	text	...

Used Measurement Mode: Pacing System Analyzer (PSA)

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
implantation psa	descriptive	DUSCHM	Single chamber mode (Single chamber devices or if leads of dual and triple chamber devices are measured consecutively in single-chamber mode, e.g. VVI)	nominal	o Yes o No
	descriptive	DUDCHM	Dual chamber mode (e.g. VDD RV)	nominal	o Yes o No
	descriptive	DUTCHM	Triple chamber mode (e.g. DDI BiV)	nominal	o Yes o No
	descriptive	DURFSE	Was radio frequency (RF) electrosurgical equipment used while the PSA was connected to the pacing lead(s)	nominal	o Yes o No

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
implantation psa	case listing for DURFSE = Yes	DURFSETY	Please specify type of RF surgical equipment used	text	...

12.1. Treatment of Missing and Spurious Data

See general definitions in chapter 5.4.

12.2. Exclusion of Particular Information

See general definitions in chapter 5.5.

No data are excluded from the specified analysis set and variables.

12.3. Descriptive Analyses

For specification "Notes = descriptive", see general definitions in chapter 5.1.

12.4. Hypotheses & Statistical Tests

There are no pre-defined statistical hypotheses.

13. General Assessments - Implantation

CIP chapter 7.5 Further data of interest

During implantation and follow-ups additional data on safety, performance and usability of the Renamic Neo system and accessories will be collected.

- *Use and assessment of PSA functionality (sensing, pacing and impedance tests)*
- *Success of adequate programming of the implant*
- *Evaluation of interrogation of the implant including RF telemetry*
- *Overall assessment of device hardware or software performance including battery use*
- *Data export evaluation (used connectivity, destination, printing)*

...

13.1. Analysis Set and Data Selection

All analyses are performed for patients in the implantation analysis set using a specific data selection before / at implantation[26].

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments	No report	autom SVTYP	Visit type	nominal	o Implantation o Pre-hospital discharge follow-up (PHD) o Regular follow-up after PHD

[26] analysis set imp SAR = Yes
Data selection for general assessments with autom SVTYP = implantation

Used Programmer Features: Implant

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	descriptive	QSPGHAS	Programmer head (PGH) telemetry	nominal	o used successfully o used, but not successfully
	descriptive#	QSPGHPRB	Did you notice any problem* (see definition above) with usage of programmer head telemetry	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" and "not available..." handled as missing	QSRFTAS	RF telemetry for implant interrogation	nominal	o used successfully o used, but not successfully o not used o not available for implant by default
	descriptive#	QSRFTPRB	Did you notice any problem* (see definition above) with usage of RF telemetry for implant interrogation	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSSAAS	Sensing amplitude	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSSAPRB	Did you notice any problem* (see definition above) with usage of sensing amplitude	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSPTAS	Pacing threshold	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSPRPRB	Did you notice any problem* (see definition above) with usage of pacing threshold	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSPITAS	Impedance test	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSPITPRB	Did you notice any problem* (see definition above) with usage of impedance test	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" OR VectorOpt not available ..." handled as missing	QSDFPAS	LV Pacing threshold and PNS measurement for different polarities	nominal	o used successfully o used, but not successfully o not used o VectorOpt not available for CRT implant
	descriptive#	QSDFPPRB	Did you notice any problem* (see definition above) with usage of LV Vector Opt function	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not done" handled as missing	QSPRGAS	Programming of the implant	nominal	o device successfully programmed o device not successfully programmed o not done
	descriptive#	QSPRGPRB	Did you notice any problem* (see definition above) with usage of programming of the implant function	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected
	descriptive with "not used" handled as missing	QSDFTAS	DFT (Defibrillation Threshold Testing) if performed in routine care	nominal	o used successfully o used, but not successfully o not used
	descriptive#	QSDFTPRB	Did you notice any problem* (see definition above) with usage of DFT	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected

If preceding variable = "used successfully" or "device successfully programmed" then impute missing data with " Used successfully".

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	case listing for QSPGHAS = used, but not successfully OR QSPGHPRB = Yes, with Adverse Event OR QSPGHPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPGHAS	Please specify reason for unsuccessful use of programmer head telemetry	text	...
	case listing for QSRFTAS = used, but not successfully OR QSRFTPRB = Yes, with Adverse Event OR QSRFTPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	CORFTAS	Please specify reason for unsuccessful use of RF telemetry for implant interrogation	text	...
	case listing for QSSAAS = used, but not successfully OR QSSAPRB = Yes, with Adverse Event QSSAPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COSAAS	Please specify reason for unsuccessful use of sensing amplitude	text	...
	case listing for QSPTAS = used, but not successfully OR QSPRPRB = Yes, with Adverse Event OR QSPRPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPTAS	Please specify reason for unsuccessful use of pacing threshold	text	...
	case listing for QSPITAS = used, but not successfully OR QSPITPRB = Yes, with Adverse Event OR QSPITPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPITAS	Please specify reason for unsuccessful use of impedance test	text	...
	case listing for QSDFPAS = used, but not successfully OR QSDFPPRB = Yes, with Adverse Event OR QSDFPPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	CODFPAS	Please specify reason for unsuccessful use of LV Vector Opt function	text	...
	case listing for QSPRGAS = used, but not successfully OR QSPRGPRB = Yes, with Adverse Event OR QSPRGPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPRGAS	Please specify reason for unsuccessful programming of the implant	text	...
	case listing for QSDFTAS = used, but not successfully OR QSDFTPRB = Yes, with Adverse Event OR QSDFTPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	CODFTAS	Please specify reason for unsuccessful use of DFT	text	...

Accuracy of PSA Measurements

The analyses specified in this sub-chapter have to be performed for the implantation analysis set only.

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	descriptive with "no comparison possible" handled as missing	DUPSAAS	Are PSA measurement results (sensitivity, pacing threshold, impedance) sufficiently accurate, compared to the measurement results of the implanted device	nominal	o Yes o No o no comparison possible

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	case listing for DUPSAAS = No OR DUPSAAS = no comparison possible including programmer serial number DIPRGSNR (see chapter15.1)	COPSAAS	Please specify No / no comparison possible	text	...

Used Programmer Features: Data export

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	descriptive	PRDEXP	Was data export performed	nominal	○ Yes ○ No
		DULAN01	**NEW: Connectivity:** LAN	nominal	○ Yes ○ No
		DUWLAN01	**NEW: Connectivity:** WLAN	nominal	○ Yes ○ No
		DUUSB01	**NEW: Connectivity:** USB	nominal	○ Yes ○ No
		QSCNNAS	Was connectivity used successfully	nominal	○ Yes ○ No
		QSCNNPRB #	**NEW: Connectivity:** Did you notice any problem* (see definition above)	nominal	○ Yes ○ No problem detected
		DUNTSH	**NEW: Data export:** Network share (for EHR)	nominal	○ Yes ○ No
		DUUSBS	**NEW: Data export:** USB stick	nominal	○ Yes ○ No
		DUOTH	**NEW: Data export:** Other	nominal	○ Yes ○ No
		PRDEXPAS	Was data export successful	nominal	○ Yes ○ No
		QSDEXPPR #	**NEW: Data export:** Did you notice any problem* (see definition above)	nominal	○ Yes ○ No problem detected

If preceding variable = "Yes" then impute missing data with "Used successfully".

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	case listing for QSCNNAS = No OR QSCNNPRB = Yes	COCNNAS	**NEW: Connectivity:** Please specify reason for unsuccessful use	text	...
	case listing for PRDEXPAS = No OR QSDEXPPR = Yes	CODEXPAS	**NEW: Data export:** Please specify reason for unsuccessful use	text	...
	case listing for DUOTH = Yes	COOTH	**NEW: Data export:** Please specify Other	text	...

Used Programmer Features: Printing

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	decriptive	PRPRNT	Was printing performed	nominal	○ Yes ○ No
		DULAN02	**NEW: Printing** LAN	nominal	○ Yes ○ No
		DUWLAN02	**NEW: Printing** WLAN	nominal	○ Yes ○ No
		DUUSB02	**NEW: Printing** USB	nominal	○ Yes ○ No
		QSPRNTAS	Was printing successful		○ Yes ○ No
		QSPRNTPR #	**NEW: Printing:** Did you notice any problem* (see definition above)	nominal	○ Yes ○ No problem detected
		DUPRNTTY	Please specify which printer type was used	nominal	...

If preceding variable = "Yes" then impute missing data with "Used successfully".

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	case listing for QSPRNTAS = No OR QSPRNTPR = Yes	CODEXPAS	**NEW: Printing:** Please specify reason for unsuccessful use	text	...

Used Programmer Features: Battery

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	descriptive with "not used" handled as missing	PRPRGB	Was the programmer used with the battery as power supply (without power cable, usage is optional)	nominal	○ used successfully ○ used, but not successfully ○ not used
	descriptive, if PRPRGB = "successfully used" then impute missing QSPRGBPR with "No problem detected".#	QSPRGBPR	**NEW: battery:** Did you notice any problem* (see definition above)	nominal	○ Yes, with Adverse Event ○ Yes, without Adverse Event ○ No problem detected

If preceding variable = "Used successfullyes" then impute missing data with "Used successfully".

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	case listing for PRPRGB= used, but not successfully OR QSPRGBPR = Yes, with Adverse Event OR QSPRGBPR = Yes, without Adverse Event including programmer serial number DIPRGSNR (see chapter15.1)	COPRGB	**NEW: Battery:** Please specify reason for unsuccessful use	text	...

Assessment of Programmer Features

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	descriptive	QSCNSAS	Are the connectivity settings (e.g. WLAN, LAN, printer) easy / difficult to find	nominal	o Very easy o Easy o Adequate o Somewhat difficult o Very difficult
		QSPSAPAS	Are the PSA parameters (e.g. amplitude, basic rate, mode) easy / difficult to find	nominal	o Very easy o Easy o Adequate o Somewhat difficult o Very difficult
		QSPGPV	Is the range of programmable variables for connectivity settings (e.g. WLAN, LAN, printer) sufficient	nominal	o Yes o No
		QSRGPSA	Is the range of the PSA parameters (e.g. amplitude, basic rate, mode) sufficient for the treatment of the patient	nominal	o Yes o No
		QSANYPRB (Note: No missing data need to be imputed)	Did you notice any problems* (including IEGM and ECG recording) which are not mentioned yet relating to the device hardware or software	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
general assessments (see Analysis Set and Data Selection)	case listing for QSCNSAS = Somewhat difficult OR QSCNSAS = Very difficult including programmer serial number DIPRGSNR (see chapter15.1)	COCNSAS	NEW: Data export: Please specify Somewhat difficult / Very difficult	text	...
	case listing for QSPSAPAS = Somewhat difficult OR QSPSAPAS = Very difficult including programmer serial number DIPRGSNR (see chapter15.1)	COPSAPAS	NEW: Printing: Please specify Somewhat difficult / Very difficult	text	...
	case listing for QSPGPV = No including programmer serial number DIPRGSNR (see chapter15.1)	COPGPV	NEW: Battery: Please specify in case of NO	text	...
	case listing for QSRGPSA = No including programmer serial number DIPRGSNR (see chapter15.1)	CORGPSA	Please specify in case of NO	text	...
	Case listing for all non-missing data including programmer serial number DIPRGSNR (see chapter15.1)	general comment	General comment	text	...

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
data SAR	case listing for any reported problem: QSPGHPRB, QSRFTPRB, QSSAPRB, QSPRPRB, QSPITPRB, QSDFPPRB, QSPRGPRB, QSDFTPRB contain "Yes"; DUPSAAS = No, QSCNNPRB, QSDEXPPR, QSPRNTPR, QSPRGBPR QSANYPRB contain "Yes"	DIPRGSNR (see chapter 15.1)	Programmer serial number	text	...

13.1. Treatment of Missing and Spurious Data

See general definitions in chapter 5.4.

13.2. Exclusion of Particular Information

See general definitions in chapter 5.5.

No data are excluded from the specified analysis set and variables.

13.3. Descriptive Analyses

For specification "Notes = descriptive", see general definitions in chapter 5.1.

13.4. Hypotheses & Statistical Tests

There are no pre-defined statistical hypotheses.

14. General Assessments – PHD & Follow-up

CIP chapter 7.5 Further data of interest

During implantation and follow-ups additional data on safety, performance and usability of the Renamic Neo system and accessories will be collected.

- *Use and assessment of PSA functionality (sensing, pacing and impedance tests)*
- *Success of adequate programming of the implant*
- *Evaluation of interrogation of the implant including RF telemetry*
- *Overall assessment of device hardware or software performance including battery use*
- *Data export evaluation (used connectivity, destination, printing)*

…

14.1. Analysis Set and Data Selection

All analyses are performed for patients in the PHD and follow-up analysis set using a specific data selection after implantation[27].

All analyses from chapter 13 Devices and Accessories - Implantation are repeated for these data. However, "implantation" will be replaced by "PHD & follow-up".

[27] analysis set PHD FUP SAR = Yes
Data selection for general assessments with autom SVTYP ≠ implantation

15. Devices and Accessories - Implantation

CIP chapter 7.5 Further data of interest
General information

- *Implant type and model, all other implanted devices*
- *Lead model and programmer software version*

During implantation and follow-ups additional data on safety, performance and usability of the Renamic Neo system and accessories will be collected.
… Information on additionally used accessories or other implanted cardiac devices

15.1. Analysis Set and Data Selection

All analyses are performed for patients in the implantation analysis set using a specific data selection before / at implantation[28].

Implanted Devices

Data file, identifier patient display id full & DIDVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
device log details	No report	DIDVTYP	General type of device/lead	nominal	o Pacemaker (single/dual chamber) o ICD (single/dual chamber) o CRT-P device o CRT-D device o ICM (Insertable Cardiac Monitor) o RA lead o RV lead o LV lead o VCS lead
		DTDVSTAT	Status of device	nominal	o Implanted and active o Deactivated but still implanted o Explanted and returned to manufacturer o Explanted and discarded o Attempted implantation, then returned … o Attempted implantation, then discarded
		DIDVMDL	Device / lead model	text	…

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
data SAR	descriptive	device model SAR[29]	Device model	text	…

[28] analysis set imp SAR = Yes
Data selection for accessory log details with SVTYP = implantation

[29] Patient-specific data for DTDVSTAT = Implanted and active AND
[DIDVTYP = Pacemaker (single/dual chamber) OR
DIDVTYP = ICD (single/dual chamber) OR
DIDVTYP = CRT-P device OR
DIDVTYP = CRT-D device OR
DIDVTYP = ICM (Insertable Cardiac Monitor)]
device model SAR = DIDVMDL

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable level	Nominal values
data SAR	descriptive	lead RA model SAR[30]	RA lead model	text	...
		lead RV model SAR[31]	RV lead model	text	...
		lead LV model SAR[32]	LV lead model	text	...
		lead VSC model SAR[33]	VCS lead model	text	...

Renamic Neo and software

Data file, identifier patient display id full & autom SVTYP	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details	No report	SVTYP	Visit type	nominal	o Implantation o Pre-hospital discharge o Follow-up

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	Selection DIPRGMDL = Renamic Neo; no report	DIPRGSNR	Programmer serial number	text	...
		DISFTVER	Programmer software version	nominal	NEO 2004.A ...

Note: In case of any reported problem, the serial number DIPRGSNR of the Renamic Neo, which was used for the specific investigation for a specific patient (or programmers in case more than one programmer were used), will be reported together with the patient id patient display id full.

Data file, identifier DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
renamicneo SAR	descriptive	n imp per renamicneo SAR[34]	Number of implantations performed with specific Renamic Neo programmer	metric to be reported as nominal	1 2 ...

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
data SAR	descriptive	n renamicneo imp SAR[35]	Number of Renamic Neo programmers used during implantation	metric to be reported as nominal	1 2 ...
		n renamicneo imp NEO2004A SAR[36]	Number of Renamic Neo programmers with software NEO 2004.A used during implantation	metric to be reported as nominal	1 2 ...

[30] Patient-specific data for lead RA model SAR = DIDVTYP = RA lead AND DTDVSTAT = Implanted and active DIDVMDL

[31] Patient-specific data for lead RV model SAR = DIDVTYP = RV lead AND DTDVSTAT = Implanted and active DIDVMDL

[32] Patient-specific data for lead LV model SAR = DIDVTYP = LV lead AND DTDVSTAT = Implanted and active DIDVMDL

[33] Patient-specific data for lead VCS model SAR = DIDVTYP = VCS lead AND DTDVSTAT = Implanted and active DIDVMDL

[34] Count different patient display id full per DIPRGSNR from accessory log details with SVTYP = Implantation

[35] Count different DIPRGSNR per patient display id full for SVTYP = Implantation

[36] Count different DIPRGSNR with DISFTVER = "NEO 2004.A" per patient display id full for SVTYP = Implantation

ECG cable

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	no report	DIECBMDL	ECG cable model	nominal	○ PK-222-L ECG cable ○ PK-222 EU / 2.8 m ECG cable
		QSECBAS	Usage of ECG cable	nominal	○ used successfully ○ used, but not successfully
		QSECBPRB	Did you notice any problems related to ECG cable	nominal	○ Yes, with Adverse Event ○ Yes, without Adverse Event ○ No problem detected

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	case listing for QSECBAS = used, but not successfully OR QSECBPRB = Yes, with Adverse Event OR QSECBPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see note before)	COECBAS	**NEW: ECG cable at investigattion:** Please specify reason for unsuccessful use	text	...

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
data SAR	descriptive	n ecgcable PK imp SAR[37]	Number of PK ECG cables used during implantation	metric to be reported as nominal	○ 1 ○ 2 ...
		n ecgcable PK222L imp SAR[38]	Number of PK-222-L ECG cables used during implantation	metric to be reported as nominal	○ 1 ○ 2 ○ ...
		n ecgcable PK222EU imp SAR[39]	Number of PK-222-EU ECG cables used during implantation	metric to be reported as nominal	○ 1 ○ 2 ...
		n ecgcable nosucccess imp SAR[40]	Number of ECG cables not successfully used during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**
		n ecgcable problem imp SAR[41]	Number of ECG cables with any problem used during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**

[37] Count DIECBMDL = "PK-222-L ECG cable" OR "PK-222 EU / 2.8 m ECG cable" per patient display id full

[38] Count DIECBMDL = "PK-222-L ECG cable" per patient display id full

[39] Count DIECBMDL = "PK-222 EU / 2.8 m ECG cable" per patient display id full

[40] Count QSECBAS = "used, but not successfully" per patient display id full

[41] Count QSECBPRB = "Yes, with Adverse Event" OR "Yes, without Adverse Event" per patient display id full

Electrode clip

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	no report	DIELDCMD	Electrode clip model	nominal	○ PK Electrode Clip
		QSELDCAS	Usage of electrode clip	nominal	○ used successfully ○ used, but not successfully
		QSELDCPR	Did you notice any problems related to electrode clip	nominal	○ Yes, with Adverse Event ○ Yes, without Adverse Event ○ No problem detected

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	case listing for QSELDCAS = used, but not successfully OR QSELDCPR = Yes, with Adverse Event OR QSELDCPR = Yes, without Adverse Event including programmer serial number DIPRGSNR (see note before)	COELDCAS	**NEW: Electrode clip:** Please specify reason for unsuccessful use	text	...

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
data SAR	descriptive	n elclip pk imp SAR[42]	Number of PK electrode clips used during implantation	metric to be reported as nominal	○ 1 ○ 2 ...
		n elclip pk nosucccess imp SAR[43]	Number of PK electrode clips not successfully used during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**
		n elclip pk problem imp SAR[44]	Number of used PK electrode clips with any problem during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**

[42] Count DIELDCMD = "PK Electrode Clip" per patient display id full

[43] Count QSELDCAS = "used, but not successfully" per patient display id full

[44] Count QSELDCPR = "Yes, with Adverse Event" OR "Yes, without Adverse Event" per patient display id full

Patient cable

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	no report	DIPCBMDL	Patient cable model	nominal	o Patient cable PK-141 o Patient cable PK-67-S o Patient cable PK-67-L o Patient cable PK-155
		QSPCBAS	Usage of patient cable	nominal	o used successfully o used, but not successfully
		QSPCBPRB	Did you notice any problems related to patient cable	nominal	o Yes, with Adverse Event o Yes, without Adverse Event o No problem detected

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	case listing for QSPCBAS = used, but not successfully OR QSPCBPRB = Yes, with Adverse Event OR QSPCBPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see note before)	COPCBAS	**NEW: Patent cable:** Please specify reason for unsuccessful use	text	...

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
data SAR	descriptive	n patcable PK imp SAR[45]	Number of patient cables PK used during implantation	metric to be reported as nominal	o 1 o 2 ...
		n patcable PK141 imp SAR[46]	Number of patient cables PK-141 used during implantation	metric to be reported as nominal	o 1 o 2 o ...
		n patcable PK67S imp SAR[47]	Number of patient cables PK-67-S used during implantation	metric to be reported as nominal	o 1 o 2 ...
		n patcable PK67L imp SAR[48]	Number of patient cables PK-67-L used during implantation	metric to be reported as nominal	o 1 o 2 ...
		n patcable PK155 imp SAR[49]	Number of patient cables PK-155 used during implantation	metric to be reported as nominal	o 1 o 2 ...
		n patcable nosucccess imp SAR[50]	Number of patient cables not successfully used during implantation	metric to be reported as nominal	o 1 o 2 **...**
		n patcable problem imp SAR[51]	Number of used patient cables with any problem during implantation	metric to be reported as nominal	o 1 o 2 **...**

[45] Count DIPCBMDL = "Patient cable PK-141" OR "67-S" OR "67-L" OR "155" per patient display id full

[46] Count DIPCBMDL = "Patient cable PK-141" per patient display id full

[47] Count DIPCBMDL = "Patient cable PK-67-S" per patient display id full

[48] Count DIPCBMDL = "Patient cable PK-67-L" per patient display id full

[49] Count DIPCBMDL = "Patient cable PK-155" per patient display id full

[50] Count QSPCBAS = "used, but not successfully" per patient display id full

[51] Count QSPCBPRB = "Yes, with Adverse Event" OR "Yes, without Adverse Event" per patient display id full

Patient adapter

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	no report	DIPADMDL	Patient adapter model	nominal	○ Patient adapter PA-1-B ○ Patient adapter PA-1-C ○ Patient adapter PA-2
		QSPADAS	Usage of patient adapter	nominal	○ used successfully ○ used, but not successfully
		QSPADPRB	Did you notice any problems related to patient adapter	nominal	○ Yes, with Adverse Event ○ Yes, without Adverse Event ○ No problem detected

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	case listing for QSPADAS = used, but not successfully OR QSPADPRB = Yes, with Adverse Event OR QSPADPRB = Yes, without Adverse Event including programmer serial number DIPRGSNR (see note before)	COPADAS	**NEW: Patent adapter:** Please specify reason for unsuccessful use	text	...

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
data SAR	descriptive	n patadapt PA imp SAR[52]	Number of patient adapters PA used during implantation	metric to be reported as nominal	○ 1 ○ 2 ...
		n patadapt PA1B imp SAR[53]	Number of patient adapters PA1B used during implantation	metric to be reported as nominal	○ 1 ○ 2 ○ ...
		n patadapt PA1C imp SAR[54]	Number of patient adapters PA1C used during implantation	metric to be reported as nominal	○ 1 ○ 2 ...
		n patadapt PA2 imp SAR[55]	Number of patient adapters PA2 used during implantation	metric to be reported as nominal	○ 1 ○ 2 ...
		n patadapt nosucccess imp SAR[56]	Number patient adapters not successfully used during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**
		n patadapt problem imp SAR[57]	Number of used patient adapter with any problem during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**

[52] Count DIPADMDL = "Patient adapter PA-1-B" OR "PA-1-C" OR "PA-2" per patient display id full

[53] Count DIPADMDL = "Patient adapter PA-1-B" per patient display id full

[54] Count DIPADMDL = "Patient adapter PA-1-C" per patient display id full

[55] Count DIPADMDL = "Patient adapter PA-2" per patient display id full

[56] Count QSPADAS = "used, but not successfully" per patient display id full

[57] Count QSPADPRB = "Yes, with Adverse Event" OR "Yes, without Adverse Event" per patient display id full

Accessory bag

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	no report	QSACCBAS	Usage of accessory bag	nominal	○ used successfully ○ used, but not successfully
		QSACCBPR	Did you notice any problems related to patient adapter	nominal	○ Yes, with Adverse Event ○ Yes, without Adverse Event ○ No problem detected

Data file, identifier patient display id full & SVTYP & helpvar model & DIPRGSNR	Notes	Variable name	Variable label	Variable level	Nominal values
accessory log details (see Analysis Set and Data Selection)	case listing for QSACCBAS = used, but not successfully OR QSACCBPR = Yes, with Adverse Event OR QSACCBPR = Yes, without Adverse Event including programmer serial number DIPRGSNR (see note before)	COACCBAS	**NEW: Accessory bag:** Please specify reason for unsuccessful use	text	...

Data file, identifier patient display id full	Notes	Variable name	Variable label	Variable Level	Nominal values
data SAR	descriptive	n abag imp SAR[58]	Number of accessory bags used during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**
		n abag nosucccess imp SAR[59]	Number of accessory bags not successfully used during implantation	metric to be reported as nominal	○ 1 ○ 2 ○ **...**
		n abag problem imp SAR[60]	Number of used accessory bag with any problem during implantation	metric to be reported as nominal	○ 1 ○ 2 **...**

[58] Count non-missing QSACCBAS per patient display id full from the above selection of accessory log details

[59] Count QSACCBPR = "used, but not successfully" per patient display id full from the above selection of accessory log details

[60] Count QSACCBPR = "Yes, with Adverse Event" OR "Yes, without Adverse Event" per patient display id full from the above selection of accessory log details

15.2. Treatment of Missing and Spurious Data

See general definitions in chapter 5.4.

15.3. Exclusion of Particular Information

See general definitions in chapter 5.5.

No data are excluded from the specified analysis set and variables.

15.4. Descriptive Analyses

For specification "Notes = descriptive", see general definitions in chapter 5.1.

15.5. Hypotheses & Statistical Tests

There are no pre-defined statistical hypotheses.

16. Devices and Accessories – PHD & follow-up

CIP chapter 7.5 Further data of interest
General information

- *Implant type and model, all other implanted devices*
- *Lead model and programmer software version*

During implantation and follow-ups additional data on safety, performance and usability of the Renamic Neo system and accessories will be collected.
… Information on additionally used accessories or other implanted cardiac devices

16.1. Analysis Set and Data Selection

All analyses are performed for patients in the PHD and follow-up analysis set using a specific data selection after implantation[61].

All analyses from chapter 15 Devices and Accessories - Implantation are repeated for these data. However, "implantation" will be replaced by and "PHD & follow-up".

[61] analysis set PHD FUP SAR = Yes
Data selection for accessory log details with SVTYP ≠ implantation

Abbreviations

ADE	Adverse Device Effect
AE	Adverse Event
AF	Atrial Fibrillation
CDMS	Clinical Data Management System
CI	Confidence Interval
CIP	Clinical Investigation Plan
CIR	Clinical Investigation Report
CRF	Case Report Form
DD	Device Deficiency
FU(P)	Follow-up
PHD	Pre-hospital discharge
SADE	Serious Adverse Device Event
SAE	Serious Adverse Event
SAP	Statistical Analysis Plan
SAR	Statistical Analysis Report
SOP	Standard Operating Procedure
SD	Standard Deviation