



**International
Standard**

**ISO/IEEE
11073-10103**

**Health informatics — Device
interoperability —**

**Part 10103:
Nomenclature, implantable
device, cardiac**

*Informatique de santé — Interopérabilité des dispositifs —
Partie 10103: Nomenclature, dispositif implantable, cardiaque*

**Second edition
2025-10**

Reference number
ISO/IEEE 11073-10103:2025(en)

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This second edition cancels and replaces the first edition (ISO/IEEE 11073-10103:2014), which has been technically revised.

The main changes are as follows:

- new nomenclature (including discriminators, co-constraints, and enumeration as appropriate):
 - device advisory information and UDI;
 - lead advisory information and UDI;
 - battery remaining timeframes and date of RRT;
 - CRT multisite pacing status and LVLV delay;
 - LV multisite pacing settings;

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- blanking and refractory settings;
- AF suppression and RV pace avoidance algorithm setting information;
- statistics for ventricular rates during atrial tachyarrhythmias and mode switch mode;
- multiple tachycardia therapy statistics (e.g. shocks, ATPs, recent, total);
- multiple episode-related information (e.g. shocks delivered, ATPs delivered, atrial/ventricular intervals);
- episode in progress flagNotifications (new containment node);
- nomenclature versioning (new containment node);
- vendor-specific enumerations;
- clarified definitions of reference IDs;
- added nomenclature version information and example values to the base terms table;
- added implementation notes Annex G;
- removed schema and XML terms annexes that were used to help publish the original nomenclature but were not part of the nomenclature;
- updated the units of measure and ensured all units have UCUM and MDC reference and term codes;
- updated example report Annex F;
- added multiple implementation notes in Annex G.

A list of all parts in the ISO/IEEE 11073 series can be found on the ISO website.

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IEEE Std 11073-10103™-2023
(Revision of IEEE Std 11073-10103-2012)

Health Informatics—Device Interoperability

Part 10103: Point-of-Care Medical Device Communication— Nomenclature—Implantable Device, Cardiac

Developed by the

IEEE 11073™ Standards Committee
of the
IEEE Engineering in Medicine and Biology Society

Approved 8 November 2023

IEEE SA Standards Board

Abstract: The base nomenclature provided in IEEE 11073 to support terminology for implantable cardiac devices is extended in this standard. Devices within the scope of this nomenclature are implantable devices such as pacemakers, defibrillators, devices for cardiac resynchronization therapy, and implantable cardiac monitors. The discrete terms necessary to convey a clinically relevant summary of the information obtained during a device interrogation are defined in this nomenclature. To improve workflow efficiencies, cardiology and electrophysiology practices require the management of summary interrogation information from all vendor devices and systems in a central system such as an Electronic Health Records (EHR) system or a device clinic management system. To address this requirement, the Implantable Device, Cardiac (IDC) Nomenclature defines a standard-based terminology for device data. The nomenclature facilitates the transfer of data from the vendor proprietary systems to the clinic EHR or device clinic management system.

Keywords: cardiac resynchronization therapy, codes, CRT, follow-up, home monitoring, ICD, IDC, IEEE 11073-10103™, implantable cardioverter defibrillator, implantable devices, implantable device cardiac, medical device communication, nomenclature, pacemaker, remote follow-up, remote monitoring, terminology

The Institute of Electrical and Electronics Engineers, Inc.
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PDF: ISBN 979-8-8557-0756-4 STD26947
Print: ISBN 979-8-8557-0757-1 STDPD26947

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Introduction

This introduction is not part of IEEE Std 11073-10103-2023, Health informatics—Device interoperability—Part 10103: Point-of-Care Medical Device Communication—Nomenclature —Implantable Device, Cardiac.

This standard enables and standardizes the reporting of discrete data elements associated with implantable cardiac device interrogations (observations) to enterprise-based applications (e.g., clinical information systems).

Information retrieved from implantable cardiac devices is transmitted and stored in centralized health records using vendor proprietary methods, or in many cases, it is managed as paper documents. By standardizing the terminology used to describe the settings and measurements of these devices, both the ordering and follow-up reporting can be integrated more easily with health care applications, such as electronic health records, order entry systems, and electronic patient records. This integration will result in greater access to critical patient information and automated verification that clinical orders have been completed in a timely fashion, ultimately resulting in increased quality of care and patient safety.

Subject domain experts provided the requirements for the nomenclature. Subject domain experts are represented by members of the Heart Rhythm Society (HRS), which is the international leader in science, education, and advocacy for cardiac arrhythmia professionals and patients, and the primary information resource on heart rhythm disorders.

This standard is a distinct and standalone partition within the IEEE 11073-10101 nomenclature. It is meant to be a self-contained and comprehensive nomenclature for information pertaining to implantable cardiac devices.

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Health informatics—Device interoperability

Part 10103: Point-of-Care Medical Device Communication— Nomenclature—Implantable Device, Cardiac

1. Overview

1.1 Scope

This standard extends the base nomenclature provided in ISO/IEEE 11073-10101:2020⁶ to support terminology for implantable cardiac devices. Devices within the scope of this nomenclature are implantable devices such as pacemakers, defibrillators, devices for cardiac resynchronization therapy, and implantable cardiac monitors. This nomenclature defines the terms necessary to convey a clinically relevant summary of the information obtained during a device interrogation. The nomenclature extensions may be used in conjunction with other IEEE 11073 standard components (e.g., ISO/IEEE 11073-10201 [B2]⁷) or with other standards, such as Health Level Seven International (HL7).

1.2 Purpose

This standard addresses the need for an openly defined, independent standard for representing information collected from industry-wide implantable cardiac devices. A broader intent is to enable a standards-based exchange of implantable cardiac device information between vendor's proprietary interrogation systems and clinic electronic medical record systems.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *is required to*).^{8,9}

⁶ Information on references can be found in Clause 2.

⁷ The numbers in brackets correspond to those of the bibliography in Annex I.

⁸ The use of the word *must* is deprecated when stating mandatory requirements; *must* is used only to describe unavoidable situations.

⁹ The use of *will* is deprecated when stating mandatory requirements; *will* is only used in statements of fact.

The word *should* indicates that among several possibilities one is recommended as particularly suitable without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (*should* equals *is recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *is permitted to*).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can* equals *is able to*).

1.4 Audience

The audience for this document is those who work with implantable cardiac device information in the context of systems integration. This may include but is not limited to the following roles:

- Cardiologist or electrophysiologist physicians
- Heart failure physicians
- Heart and device clinic specialists or staff
- Primary care physicians
- Clinic information technologists
- Clinic information system vendor engineers
- Implantable cardiac device vendor engineers
- Regulatory and quality management agencies

1.5 Context

This nomenclature has been developed within the context of the broader 11073 Health informatics—Point of care medical device communication standards. Its goal is to be consistent with existing 11073 standards and information models.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IHE Patient Care Device (PCD) Technical Framework, Volume 1, IHE PCD TF-1, Profiles (Revision 7.0 – Final Text, December 12, 2019).¹⁰

IHE Patient Care Device (PCD) Technical Framework, Volume 2, IHE PCD TF-2, Transactions (Revision 7.0 – Final Text, December 12, 2019).¹¹

¹⁰ Volume 1 of the IHE Patient Care Devices Technical Framework is available at http://www.ihe.net/uploadedFiles/Documents/PCD/IHE_PCD_TF_Vol1.pdf.

¹¹ Volume 2 of the IHE Patient Care Devices Technical Framework is available at http://www.ihe.net/uploadedFiles/Documents/PCD/IHE_PCD_TF_Vol2.pdf.

ISO/IEEE 11073-10101:2020, Health informatics—Device Interoperability—Part 10101: Point-of-care medical device communication—Nomenclature.¹²

The Unified Code for Units of Measure (UCUM), version 2.1.¹³

3. Definitions, acronyms, and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. The [IEEE Standards Dictionary Online](#) should be consulted for terms not defined in this clause.¹⁴

arrhythmia: Any abnormality of cardiac rhythm. Examples are bradycardia, dysrhythmia, and tachycardia.

cardiac monitors: A device that shows the electrical waveforms of the cardiovascular system for measurement and treatment.

cardiac resynchronization therapy: A treatment that can relieve congestive heart failure symptoms by improving the coordination of the heart's contractions.

cardiologist: Physician specializing in disorders of the heart.

centralized health record: *See:* **electronic health records (EHR).**

clinic information system vendor engineers: Personnel employed by the clinic to create, enhance, and maintain the computerized information systems that reside in a clinic.

co-constraint: A rule describing a constraint whose scope is inclusive of more than one term.

constraint: A restriction on the set of values being assigned.

containment node: An intermediate node within the containment hierarchy (tree graph) of the nomenclature.

defibrillator: *See:* **implantable cardioverter defibrillator (ICD).**

device clinic: A specialized physician clinic that provides follow-up service to patients with an implanted pacemaker or cardioverter defibrillator (ICD).

discriminators: A mechanism to provide additional semantic refinement to multiple terms.

domain information model (DIM): The model describing common concepts and relationships for a problem domain.

¹² ISO/IEEE publications are available from the International Organization for Standardization (<https://www.iso.org/>) and The Institute of Electrical and Electronics Engineers (<https://standards.ieee.org/>).

¹³ UCUM is available at <https://ucum.org/ucum.html>. An overview and useful supporting information are available at <https://unitsofmeasure.org/>.

¹⁴ *IEEE Standards Dictionary Online* subscription is available at: <https://dictionary.ieee.org>. An IEEE Account is required for access to the dictionary, and one can be created at no charge on the dictionary sign-in page.

electronic health records (EHR): A longitudinal collection of electronic health information about individual patients or populations. It is a record in digital format that is capable of being shared within across different health care settings by being embedded in network-connected enterprise-wide information system.

electrophysiologist: A physician with advanced study of the electrical properties of the heart.

implantable cardiac device: A small, battery-powered electrical impulse generator that is implanted in patients to maintain heart rate or deliver a high-powered shock to correct cardiac arrhythmia. *See also:* **defibrillator; pacemaker.**

implantable cardiac device vendor engineers: Personnel employed by the implantable cardiac device vendors who create, enhance, and maintain the computerized information systems that support their devices.

implantable cardioverter defibrillator (ICD): A small, battery-powered electrical impulse generator that is implanted in patients who are at risk of sudden cardiac death. The device is programmed to detect cardiac arrhythmia and correct it by delivering a shock of electric current.

interrogation: The process of communicating with and retrieving data from an implantable medical device.

nomenclature: A set of names or terms comprising a taxonomy for a specific domain.

pacemaker: A small, battery-powered electrical impulse generator which is implanted in patients to support or maintain heart rate.

programming: The noninvasive adjustment of programmable parameters in a implantable cardiac device.

reference ID: A unique, symbolic, and programmatic form for the term. The form is correlated to the context-free code (i.e., titles are by definition context-free with respect to all other titles); all terms are prefixed with “MDC_IDC_” for consistency.

rhythm disturbance: An irregular heartbeat.

systematic name: An organization of differentiating, relational descriptors that are unique for each term.

terminology: A synonym for nomenclature.

vendor proprietary equipment: Device vendor equipment or systems used for management and analysis of devices.

vendor-specific enumeration: Vendor-specific enumerated values for a term.

3.2 Acronyms and abbreviations

AT	atrial tachycardia
ATP	antitachycardia pacing
CRT	cardiac resynchronization therapy
DIM	domain information model
HL7	Health Level Seven
ICD	implantable cardioverter defibrillator

ICS	implementation conformance statement
ID	identifier
IDC	implantable device, cardiac
LA	left atrium
LV	left ventricle
MDC	medical device communication
NBG	NASPE/BPEG generic
RA	right atrium
RV	right ventricle
UCUM	unified code of units of measure
VF	ventricular fibrillation
VT	ventricular tachycardia

4. Introduction to IEEE 11073 implantable devices cardiac domain

Millions of people experience irregular heartbeats at some point in their lives. Most of these irregularities, called arrhythmias, are harmless and can occur in people free from heart disease. Sometimes, however, rhythm disturbances can be serious or even fatal.

Often, cardiac rhythm disease or arrhythmias are caused by problems with the electrical system that regulates the steady, rhythmic beat of the heart. The heartbeat may be too slow or too fast; it may remain steady, become chaotic, or lack efficiency. Some arrhythmias are dangerous and cause sudden cardiac death, while others may be bothersome but are not life threatening.

Implantable cardiac devices monitor the heart's rhythm continuously and may apply therapy based on conditions detected. These devices are designed to deliver controlled electrical stimulus to the heart to maintain normal rhythm, improve the efficiency, or stop serious arrhythmias. The devices can have their settings programmed to optimize how therapy will be applied and have capabilities to store data for later retrieval and analysis. These devices are categorized as pacemakers, implantable cardioverter defibrillators (ICD), devices for cardiac resynchronization therapy (CRT), or implantable cardiac monitors.

There are typically two major components of the implantable cardiac device system: the pulse generator and the leads. The pulse generator contains the power source and electronic circuitry. The pulse generator senses physiological conditions, applies algorithms to determine therapy, stores data, and produces the electric output stimuli. Some devices are monitor-only devices and do not deliver therapy. The second component, a lead, is an insulated wire used to conduct pulse generator outputs to the heart tissue and to transmit electrical potentials from the heart or other sensing components to sensing circuits of the pulse generator.

Figure 1 provides an overview graphic of the implanted pulse generator and leads.

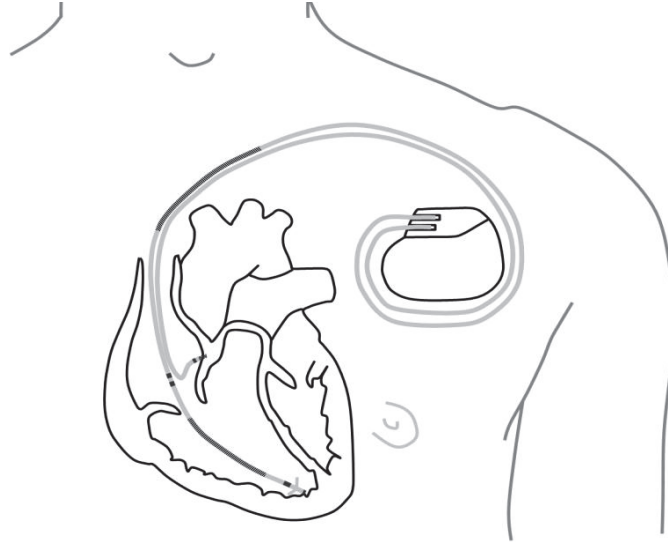


Figure 1—Pulse generator/leads

Cardiologists and electrophysiologists are trained physicians who diagnose arrhythmias and implant appropriate cardiac device for diagnosis and treatment. Typically, cardiologists and electrophysiologists follow patients with implantable cardiac devices manufactured by multiple vendors.

Information from the implantable cardiac device is retrieved using vendor proprietary equipment and systems. This procedure of retrieving implanted device data is called “interrogation.” Interrogations are performed either in-clinic or remotely and are stored in the vendor interrogation systems. Clinics need to integrate data from multiple vendor interrogation systems into a centralized health record to improve workflow efficiencies. Mapping information from multiple proprietary vendor data formats into the central health is complicated and expensive.

A common set of terms is provided in IEEE Std 11073-10103 that can be used to exchange information between vendor and clinic systems. Centralized health record systems benefit from standardized interfaces. The IEEE 11073-10103 Implantable Device, Cardiac (IDC) Nomenclature defines the standard terminology for these interfaces. Figure 2 shows a representation of where the IEEE 11073-10103 IDC nomenclature could be used.

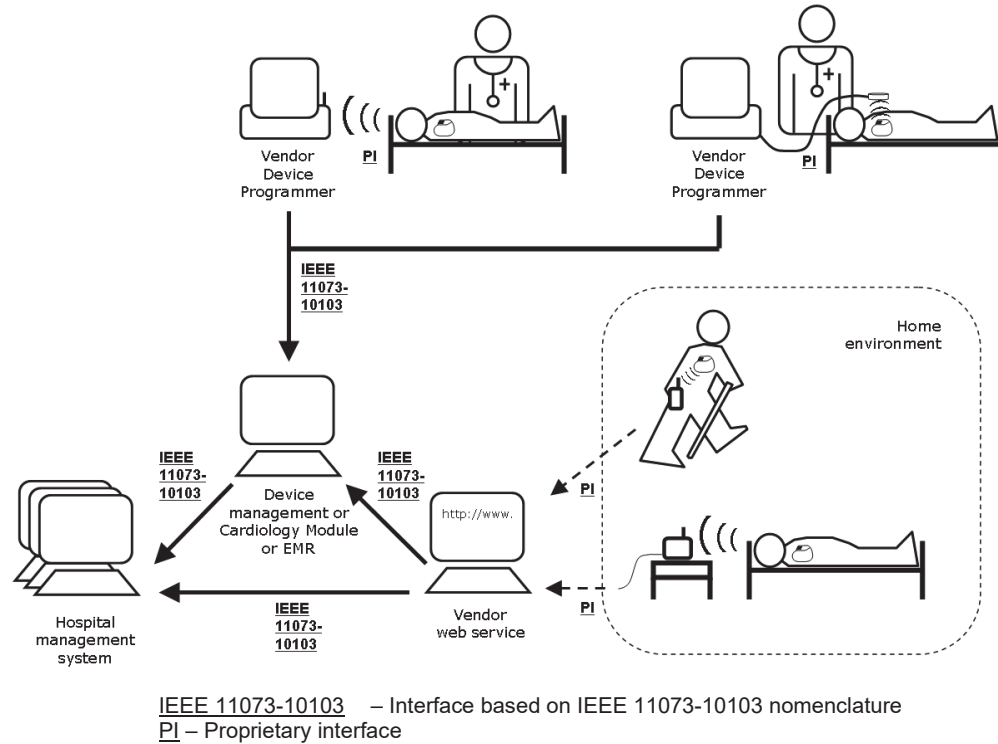


Figure 2—IEEE 11073-10103 usage diagram

5. Nomenclature requirements

5.1 Overview

Nomenclature in this standard defines normative text identifiers and numeric code identifiers for labeling implantable cardiac device data. It also specifies normative constraints for usage in regard to semantic meaning, data type, unit of measure, and enumerated values.

Requirements are defined by subject domain experts. Subject domain experts are represented by members of the Heart Rhythm Society, which is the international leader in science, education and advocacy for cardiac arrhythmia professionals and patients, and is the primary information resource on heart rhythm disorders.

The requirements for the nomenclature fall into multiple categories, as follows:

- The scope of the nomenclature
- The organizational structure of the nomenclature
- The semantics of the nomenclature

5.2 Scope requirements

The following requirements regarding the scope and content of the standard were used:

- Level of detail shall be summary information as specified and understood by subject domain experts.
- Shall only define terms that are common across domain.
- Shall allow for specific vendor enumerations of terms when needed.

5.3 Organizational structure requirements

The following requirements regarding the scope and content of the standard were used:

- Term identifiers shall be organized in a consistent hierarchical classification scheme.
- Shall be organized to reduce post coordination of terms.

5.4 Semantic requirements

The following requirements regarding the semantic definitions were used:

- Domain experts will discuss and define term semantic requirements.

6. Nomenclature structure

6.1 Overview

Nomenclature in this standard is structured based on a hierarchical taxonomy or containment hierarchy. A tree graph has been used to represent the containment hierarchy or the semantic organization of the terminology (Figure 3). The base root node is MDC_IDC, which is short for Medical Device Communication—Implantable Device Cardiac. The IDC nomenclature is a code space within a partition of the ISO/IEEE 11073-10101 nomenclature.

Nodes within the tree graph were determined through interaction with clinical domain experts. Clinical concepts for the domain were identified through definition and analysis of a typical device follow-up summary report. Concepts were categorized and arranged in a hierarchical structure of nodes.

Discriminators are used to provide semantic refinement to many base terms. The application of a discriminator to a base term results in a term with distinct semantic significance and unique reference identifiers and codes. A discriminator is composed of a numerical offset value, a string value that serves as a suffix or infix value, and a short description. Homologous discriminators are grouped into discriminator sets. Discriminator sets are identified by a unique uppercase string, e.g., CHAMBER. Base terms to which discriminators must be applied are identified by the inclusion of one or more discriminator set identifiers enclosed in square brackets in their reference identifiers, e.g., LEADCHNL_[CHAMBER]. Base terms that contain discriminator set identifiers shall be resolved into expanded terms in order to be valid for inclusion in messages. A comprehensive set of these expanded terms are included in Table C.1. A base term is expanded by substituting the square brackets containing the discriminator set identifier with the string value of a specific discriminator from the discriminator set identified by the discriminator set identifier and computing that discriminator's numerical offset value. For example, a base term LEADCHNL_[CHAMBER] may be expanded into LEADCHNL_RV (see Table C.1). The set of all terms resulting from

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IEEE Std 11073-10103-2023
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Nomenclature—Implantable Device, Cardiac

the application of all discriminators in the CHAMBER discriminator set to LEADCHNL_[CHAMBER] would result in terms with the following reference identifiers LEADCHNL_RA, LEADCHNL_RV, LEADCHNL_LA, LEADCHNL_LV, and LEADCHNL_MIXED. Discriminator sets for the containment hierarchy are defined in tables below.

A term is uniquely identified by a Reference ID, Systematic Name and an integer Code according to the scheme described in ISO/IEEE 11073-10101:2020. A term's Reference ID consists of following a sequential path through the containment hierarchy from the root node to a leaf node. Each node on this path becomes a component of the term's Reference ID and Systematic Name, and appropriately it represents the semantic of the term. After expanding all discriminators, a unique integer Code is then assigned to each term from a 16-bit partition or code block of the -10101 code space that has been allocated for the exclusive use of the IDC nomenclature.

The tree graph of the containment hierarchy is shown in Figure 3.

In Figure 4 (Table 1) through Figure 7 (Table 4), portions of the tree graph are shown for containment nodes to facilitate readability. Each node of the graph contains a clinical concept and a text identifier. Only the root node and other containment nodes are shown as these are the organizing concepts of the nomenclature. Instances of leaf nodes or terms are listed in Annex A and Annex C.

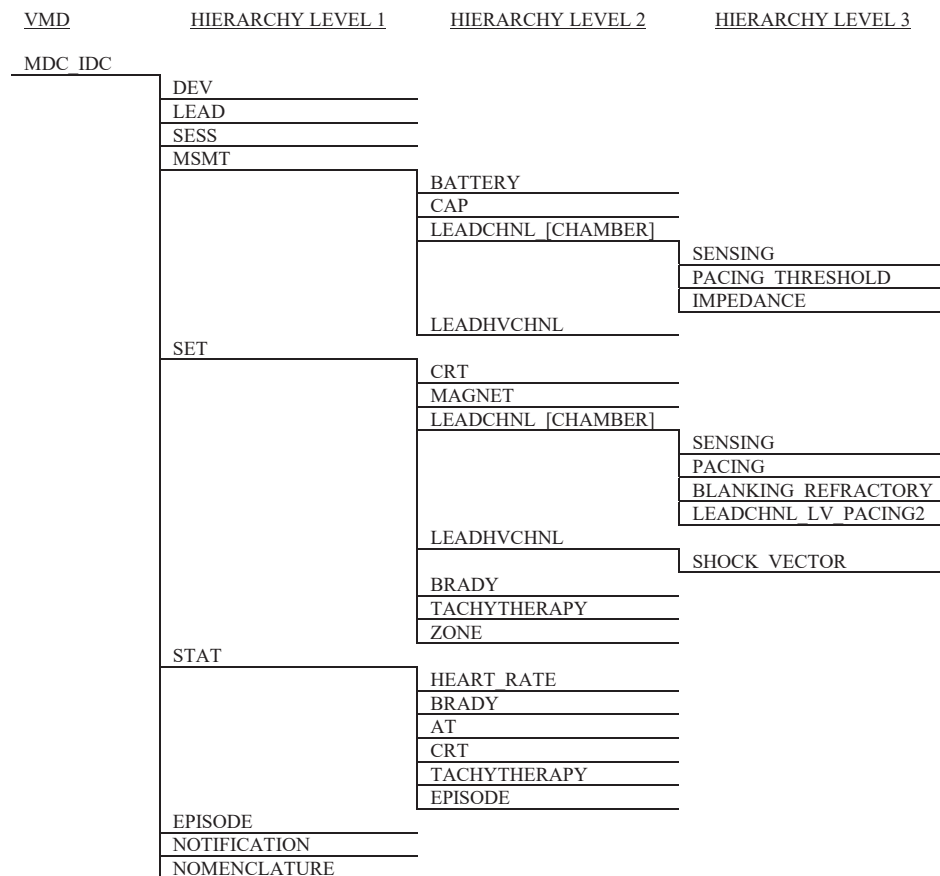


Figure 3—11073-10103 containment hierarchy

6.2 Highest level containment nodes

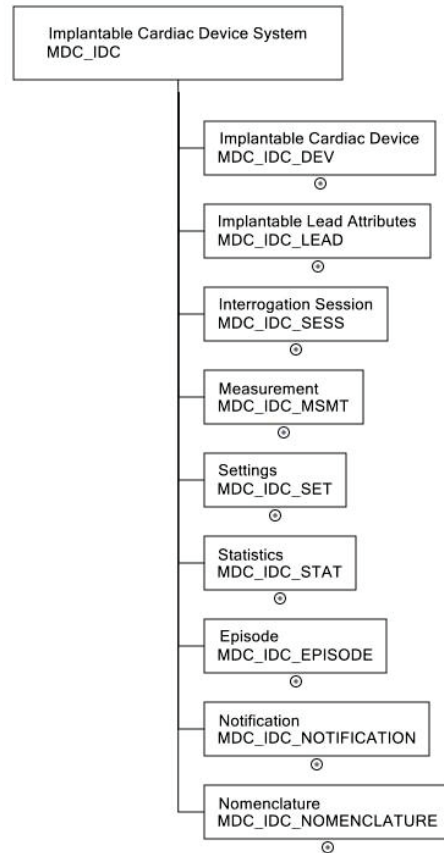


Figure 4—Highest level containment nodes

Table 1—High-level node descriptions

Name	Containment node/Reference ID component MDC IDC	Description
Implantable Cardiac Device	DEV	Attributes specific to the physical implantable cardiac device.
Implantable Lead Attributes	LEAD	Attributes specific to the physical leads of the device system.
Interrogation Session	SESS	Interrogation session where observations were made.
Measurement	MSMT	Measurements concerning the device or patient.
Settings	SET	Device settings that determine device behavior.
Statistics	STAT	Aggregate statistics concerning the device or patient conditions.
Episode	EPISODE	Device sensed episodes.
Notification	NOTIFICATION	Information representing notifications. Used to inform the consumer that actionable data is included in the message.
Nomenclature	NOMENCLATURE	Attributes of the ISO/IEEE 11073-10103 nomenclature for the observation message.

6.2.1 Measurement nodes

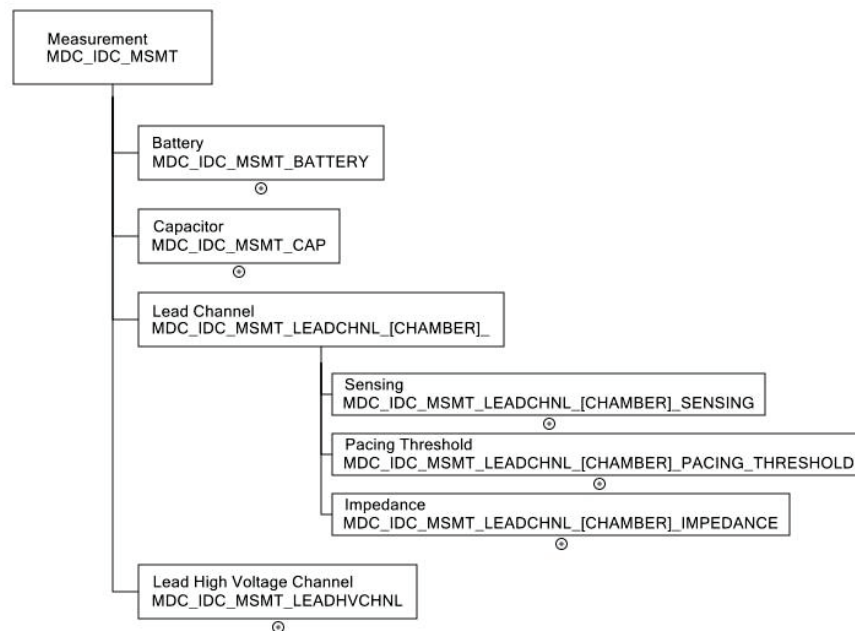


Figure 5—Measurement nodes

Table 2—Measurement nodes descriptions

Name	Containment node/Reference ID component MDC IDC MSMT	Description
Battery	BATTERY	Device battery measurements.
Capacitor	CAP	Device capacitor measurements.
Lead channel	LEADCHNL_[CHAMBER]	Device's lead electrical channel measurements.
Sensing	LEADCHNL_[CHAMBER]_SENSING	Sensing measurements of a particular lead electrical channel.
Pacing threshold	LEADCHNL_[CHAMBER]_PACING_THRESHOLD	Pacing threshold measurements for a particular lead electrical channel.
Impedance	LEADCHNL_[CHAMBER]_IMPEDANCE	Impedance measurements for a particular lead electrical channel.
Lead high-voltage channel	LEADHVCHNL	Device's high-voltage channel measurements.

6.2.2 Settings nodes

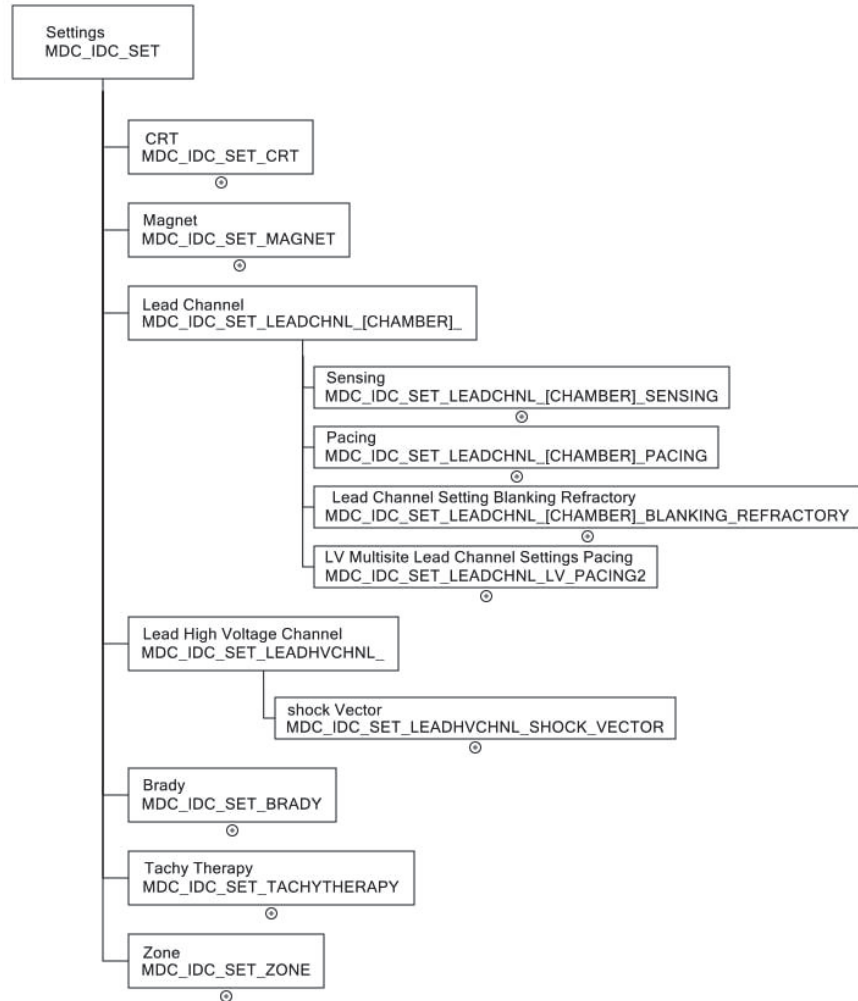


Figure 6—Settings nodes

Table 3—Settings node descriptions

Name	Containment node/Reference ID component MDC IDC SET	Description
CRT	CRT	Cardiac resynchronization therapy settings.
Magnet	MAGNET	Magnet settings.
Lead channel	LEADCHNL [CHAMBER]	Lead electric channel settings.
Sensing	LEADCHNL_[CHAMBER]_SENSING	Sensing settings for a particular lead electric channel.
Pacing	LEADCHNL_[CHAMBER]_PACING	Pacing settings for a particular lead electric channel.
Blanking and refractory	BLANKING_REFRACTORY	The group of blanking and refractory period settings.
Lead LV Multisite Pacing Channel	LEADCHNL_LV_PACING2	LV Multisite pacing settings for the additional vector.
Lead high-voltage channel	LEADHVCHNL	Lead high-voltage electric channel settings.
Shock vector	LEADHVCHNL_SHOCK_VECTOR	Shock vector settings for a lead high-voltage electric channel.
Brady	BRADY	Brady therapy settings.
Tachy therapy	TACHYTHERAPY	Tachy therapy settings.
Zone	ZONE	Tachy detection/therapy zone settings.

6.2.3 Statistics nodes

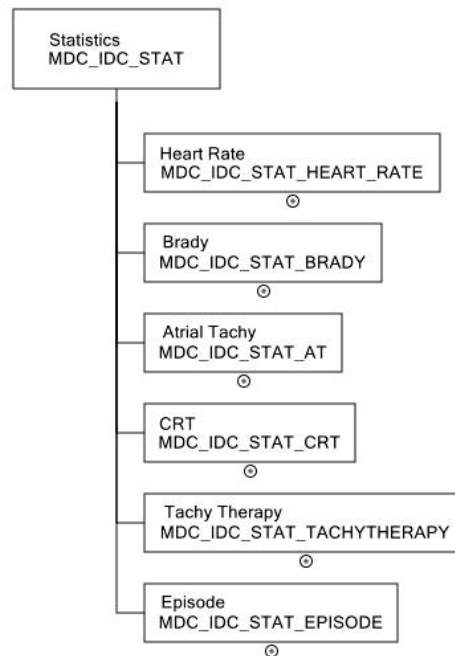


Figure 7—Statistic nodes

Table 4—Statistics node descriptions

Name	Containment node/Reference ID component MDC IDC STAT	Description
Heart rate	HEART RATE	Heart rate statistics.
Brady	BRADY	Brady therapy statistics.
Atrial tachy	AT	Atrial tachyarrhythmia statistics.
CRT	CRT	Cardiac resynchronization therapy statistics.
Tachy therapy	TACHYTHERAPY	Tachy therapy statistics.
Episode	EPISODE	Episode statistics.

6.2.4 Discriminators in containment hierarchy

One set of discriminators [CHAMBER] is used to create the identifiers for the following containment nodes:

MDC_IDC_MSMT_LEADCHNL_[CHAMBER]

MDC_IDC_SET_LEADCHNL_[CHAMBER]

Rationale:

Implantable cardiac systems usually consist of more than one lead, and those leads can be located in different chambers of the heart. To address this, a set of discriminators is used that represents each of the four chambers of the heart and additional locations where leads may be placed (Table 5).

Table 5—Containment node discriminators

Discriminator Set Identifier	Value	Description
CHAMBER	RA	Right atrial
	RV	Right ventricle
	LA	Left atrial
	LV	Left ventricle
	MIXED	Multiple chambers

7. Conformance

7.1 Applicability

Conformance to definitions of this standard is specified primarily at the appropriate application or system interface. It is expected that this standard will be referenced by other healthcare systems integration standards or profiles that define specific applications of the nomenclature.

7.2 Conformance specification

To support interoperability of applications and systems, an implementation based on this standard shall provide specific details about the way that the definitions of this standard are applied.

7.3 Implementation conformance statements (ICSs)

The general format of the ICSs is in the form of tables. Templates for these ICS tables are given in Table 6 through Table 8. The tables are to be filled out and provided as an overall conformance statement document.

Generally the column headers of an ICS table contain the following information:

- Index, which is an ID (e.g., a number) of a specific feature.
- Feature, which briefly describes the characteristic for the conformance statement to make.
- Reference, which is a reference to the definition of the feature (may be empty).
- Status, which specifies the conformance requirement (i.e., the requirements for a conforming implementation regarding the feature). In some cases, this standard does not specify conformance requirements but still wants a definition of the status for a particular feature.
- Support, which is filled out by the implementer and specifies the characteristics of the feature in the implementation.
- Comment, which contains additional information provided by the implementer.

7.4 General ICS

In a top-level general ICS, the implementer specifies versions/revisions that are supported by the implementation as well as by a conformance level.

Table 6—General conformance requirements

Index	Feature	Reference	Status	Support	Comment
GEN-1	Implementation Description	—	Identification of the device/application. Description of the functionality.		
GEN-2	Standard Document Revision	Standard document.	Identification of the supported revisions to IEEE Std 11073-10103.	Set of supported revisions to IEEE Std 11073-10103.	
GEN-3	Conformance Adherence - Level 1 -	—	Base conformance declaration that device/application meets the IEEE 11073-10103 mandatory conformance requirements.		
GEN-4	Conformance Adherence - Level 2 -	—	In addition to GEN-3 declaration that device/application meets the IEEE 11073-10103 optional conformance requirements.		

7.5 Mandatory ICS

In the Mandatory ICS, the implementer specifies that the implementation supports the normative conformance requirements of the standard.

Table 7—Mandatory conformance requirements

Index	Feature	Reference	Status	Support	Comment
REQ-1	Identification	—	-Mandatory- Does the implementation have strict adherence to the IEEE 11073-10103 constraints for unique reference identifier?	Yes/No (No implies non-conformant)	
REQ-2	Coding	—	-Mandatory- Does the implementation have strict adherence to the IEEE 11073-10103 constraints for term codes?	Yes/No (No implies non-conformant)	
REQ-3	Attributes	—	-Mandatory- Does the implementation have strict adherence to the IEEE 11073-10103 constraints for term attributes data type, data format, and unit of measure?	Yes/No (No implies non-conformant)	
REQ-4	Enumerations	—	-Mandatory- Does the implementation have strict adherence to the IEEE 11073-10103 constraints for terms of type Enum?	Yes/No (No implies non-conformant)	
REQ-5	Semantics	—	-Mandatory- Does the implementation have strict adherence to the IEEE 11073-10103 constraints for term semantics (definition)?	Yes/No (No implies non-conformant)	

7.6 Optional ICS

In the Optional ICS, the implementer specifies that the implementation supports the informative conformance requirements of the standard.

Table 8—Optional conformance requirements

Index	Feature	Reference	Status	Support	Comment
OPT-1	Vendor enumeration		-Withdrawn-	—	These enumerations are normative and not optional (see REQ-4 in Table 7)
OPT-2	Co-constraints	—	-Optional- Does the implementation have strict adherence to the IEEE 11073-10103 informative co-constraints for primary key, optionality, cardinality, and co-constraint rules?	Yes/No (No implies non-Level II conformance)	

8. Extensibility/versioning

Term identifiers in this standard are immutable. Identifiers shall never be retired or reused. General semantics of term definitions should never be changed. Careful consideration should always be exercised when refining semantics of any term definition.

All other constraints and text within the standard can be revised. The standard shall carry a version number that specifies a revision. Modifications to the standard's text clauses or existing term constraints, or the addition of new text clauses or terms shall incur a revision and new version number.

The version identifier shall be a string that shall consist of the following:

- The major version number: This is the first (leftmost) integer value in a sequence of three such values separated by periods. The major version number shall be increased when an IEEE balloted version with significant changes that impact backward compatibility has been approved.
- The minor version number: This is the second integer value in a sequence of three such values separated by periods. The minor version number shall be increased when an IEEE balloted version with incremental additions, improvements, or fixes over the last version has been approved.
- The draft version number: This is the third integer in a sequence of three such values separated by periods. The draft version number is increased for draft versions. The draft version may be initiated by IDC Nomenclature working group or a specific vendor. Non-zero draft versions are not normative. The draft version number shall be zero for a balloted normative standard. If the draft version number is non-zero it shall be followed by a qualifier string described below.
- The qualifier string: This is a human readable string (ideally consisting of an underbar followed by only ASCII letters and digits) that uniquely identifies the IDC Nomenclature working group or a vendor. The vendor should include a version indicator after the vendor identifier. Each vendor should be self-consistent when specifying the qualifier string. The qualifier string, “IDC” shall be reserved for use by the IDC Nomenclature working group.

Examples:

- a) “1.2.3_vendor” where “1” is the major version number, “2” is the minor version number, “3” is the draft version number, and “_vendor” is the qualifier string.
- b) When 1.0.2_IDC is balloted and approved, the version becomes 1.1.0.
- c) “1.0.0” indicates the version is the first IEEE balloted version; there are no incremental or unballoted changes.
- d) “1.0.1_IDC” indicates the version has unballoted changes made by the IDC Nomenclature working group on the base (1.0.0) IEEE balloted version.
- e) “1.0.2_IDC” indicates the version has unballoted changes made by the IDC Nomenclature working group on the draft version, 1.0.1_IDC.
- f) “1.0.1_BSXI” indicates the version has unballoted changes made by the vendor Boston Scientific on the draft version 1.0.1_IDC. Additionally, a “1.0.1_BIO1” version has unballoted changes made by the vendor Biotronik on the draft version 1.0.1_IDC

Annex A

(normative)

Base terms

A.1 Overview

This annex presents the base terms of the nomenclature and their attributes. A base term is defined as a term prior to expansion of any included discriminators. Defining attributes at the base term level simplifies management of the nomenclature. This nomenclature defines the discrete terms necessary to convey a clinically relevant summary of the information obtained during an implantable cardiac device interrogation. Due to the specialized nature of implantable cardiac device attributes and intercardial observations, a separate, distinct, and standalone partition within the existing ISO/IEEE 11073-10101:2020 was created.

This standard also presents the containment nodes used to group-related terms. The containment nodes aggregate terms into sets with a related clinical semantic. Containment nodes are shaded gray and have a Type of “GROUP.”

A.2 Base term attributes

A.2.1 Reference identifier

The reference identifier or reference ID is a string that uniquely identifies each term of the nomenclature. All base term and containment node reference identifiers are prepended with “MDC_IDC_”.

Reference identifiers may contain discriminators (see Clause 6). A table of discriminators is listed at the end of this annex.

A.2.2 Display name

The display name is a text phrase that describes a term and is suited for presenting terms on a report or user interface. Also see Annex H for blanking and refractory display names.

A.2.3 Definition

The definition is a formal statement that describes the meaning or semantic of the term.

A.2.4 Type

The data type of the base term.

The following data types are used for base terms.

- Date time: Specifies a point in time using a 24-h clock notation.
- Enum (Enumeration): Specifies a value that shall be one of the values specified by the enumeration group to which the term is bound. Lists of allowed values for terms of type Enum are listed in Annex D and Annex E.
- Numeric: Specifies a number represented as a series of ASCII numeric characters consisting of an optional leading sign (+ or –), the digits, and an optional decimal point.
- String: Specifies a set of any displayable characters except the defined control characters. Strings are left justified with trailing blanks optional.

For containment nodes, the data type is always GROUP.

The IHE PCD-09 profile provides further implementation details (see Normative references, Clause 2).

Although this reference is concerned with HL7 v2 messaging format, the use of these data types shall be adhered to regardless of messaging protocol.

A.2.5 Format

The data format for a specific data type.¹⁵ The following two types of data formats are specified.

- String length: This is specified as a standalone integer and signifies the maximum length of a string value.
- Numeric format: This is specified as $F_n.d$ where n is an integer representing the maximum number of digits allowed before the decimal place and d is an integer representing the maximum number of digits allowed after the decimal place.

A.2.6 Unit of measure

The standard unit or system of units by means which a term quantity is accounted for or expressed. The units of measure used are shown in Table A.1. These units are normative and are required to be used as documented in Table A.2.

Table A.1—Units of measure

Unit_of_Measure	UCUM Unit	MDC RefID	MDC term code (context free code)
Percent	%	MDC_DIM_PERCENT	262688
Volts	V	MDC_DIM_X_VOLT	266400
Millivolts	mV	MDC_DIM_MILLI_VOLT	266418
Ohms	Ohm	MDC_DIM_X_OHM	266432
Joules	J	MDC_DIM_X_JOULES	266112
Minutes	min	MDC_DIM_MIN	264352
Milliseconds	ms	MDC_DIM_MILLI_SEC	264338
Seconds	s	MDC_DIM_X_SEC	264320
Hours	h	MDC_DIM_HR	264384
Months	mo	MDC_DIM_MON	264480
Sequences	{seq}	MDC_DIM_SEQUENCE	274592
Shocks	{shocks}	MDC_DIM_SHOCK	274624
Mode switches	{switches}	MDC_DIM_SWITCH	274656
Heartbeats	{beats}	MDC_DIM_BEAT	263232
Heartbeats per minute	{beats}/min	MDC_DIM_BEAT_PER_MIN	264864

A.2.7 Enumeration group

Terms that are of type Enum always specify an enumeration group. The enumeration group refers to a set of values. Tables that list values for specific enumeration groups are listed in Table D.1, Table E.1, Table E.2, Table E.3, Table E.4, and Table E.5. Enumeration groups are indicated in this document with a preceding underscore.

¹⁵ Format is originally from HL7 v2, but is expected to be applied to and implemented by all messaging protocols that conform to this standard.

A.2.8 Version (Ver)

Terms are version 1.0.0 for the 2012 initial release of the nomenclature and 1.1.0 for the 2023 revision. See Clause 8 for versioning details.

A.2.9 Other attributes

K (primary key), O (optionality), C (cardinality), and CC (co-constraint) are informative properties and are described in detail in Annex B.

A.3 Partition details

ISO/IEEE 11073-10103 nomenclature has been assigned a 32-bit code space. This standard is the 11th partition from the ISO/IEEE 11073-10101 codes space with a partition size of 65 536 values. Multiplying the 64K partition size by the partition number results in the partition beginning at the offset value 720 896 and ends at 786 432. This code space has been subpartitioned into sections for terminology, enumeration values, and vendor-specific terms. The current vendor-specific subpartition supports up to 16 vendors with each vendor having 1024 codes. Specific term and enumeration code values are presented in Annex C through Annex E.

A.4 Table of base terms

NOTE—Rows in the table with GROUP as the Type are Reference IDs for containment nodes that may be used in protocols other than HL7 V2.

Format and Optionality are originally from HL7 v2, but are expected to be applied to and implemented by all messaging protocols that conform to this standard.

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend "MDC_IDC "	Ver	Example value	K	O	C	CC
DEV	Implantable cardiac device	The group of cardiac device attributes.	GROUP	—	—	—	—	—	—	—	1.1	—
DEV_TYPE	Implantable cardiac device type	The type of cardiac device.	Enum	N/A	—	ENUM_DEV_TYPE	1.0.0	CRT_D	—	R	—	—
DEV_MODEL	Implantable cardiac device model	The model identifier of a cardiac device.	String	50	—	—	1.0.0	Supercapac	Y	R	—	—
DEV_SERIAL	Implantable cardiac device serial number	The serial number of a cardiac device.	String	40	—	—	1.0.0	PM88881234	Y	R	—	—
DEV_MFG	Implantable cardiac device manufacturer	The manufacturer of the cardiac device.	Enum	N/A	—	ENUM_MFG	1.0.0	BIO	Y	R	—	—
DEV_IMPLANT_DT	Implantable cardiac device implant date	The implant date of the cardiac device.	DateTime	N/A	—	—	1.0.0	20090511170125	—	—	—	—
DEV_IMPLANTER	Implantable cardiac device implanter	The name of the physician that implanted the cardiac device.	String	50	—	—	1.0.0	Dr. A. Miller	—	—	—	—
DEV_IMPLANTER_CONTACT_I NFO	Implantable cardiac device implanter contact information	The contact information of the physician that implanted the cardiac device.	String	100	—	—	1.0.0	Phone: 43214321, e- mail: miller@cityclinic.org	—	—	—	—
DEV_IMPLANTING_FACILITY	Implantable cardiac device implanting facility	The facility (clinic/hospital) where the cardiac device was implanted.	String	100	—	—	1.0.0	London City clinic	—	—	—	—
DEV_ADVISORY_INFO_STATU S	Implantable Cardiac Device Advisory Information Status	This is an indication of the availability or status of advisory information of the cardiac device.	Enum	N/A	—	ENUM_ADVISORY_STATUS	1.1.0	Advisory	—	R	—	—
DEV_ADVISORY_INFO	Implantable Cardiac Device Advisory Information	Advisory information summary text for the given device type or serial number.	String	100	—	—	1.1.0	Early battery depletion possible	—	—	—	—
DEV_ADVISORY_INFO_URL	Implantable Cardiac Device Advisory Information URL	URL to advisory information for the given device type or serial number.	String	255	—	—	1.1.0	https://example.vend or.com/example_url/ batterydepletion.pdf	—	—	—	—
DEV_UNIQUE_ID	Implantable Cardiac Device Unique ID	A unique identifier for the device (e.g., UDI) that is unique throughout the world and is from an accredited issuing agency.	String	100	—	—	1.1.0	(01)0061399449373 6(17)221111(10)PM 88881234	—	—	—	CC6
DEV_UNIQUE_ID_ISSUER	Implantable Cardiac Device Unique ID Issuer	The accredited issuing agency for the device unique ID.	String	40	—	—	1.1.0	GS1	—	—	—	CC6

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC_IDC "	Ver	Example value	K	O	C	CC
LEAD	Implantable lead attributes	The group of lead attributes.	GROUP	—	—	—	—	—	—	—	0..N	—
LEAD_MODEL	Implantable lead model	The model of the lead.	String	50	—	—	1.0.0	OptSense XXL	Y	RE	—	—
LEAD_SERIAL	Implantable lead serial number	The serial number of the lead.	String	40	—	—	1.0.0	5020304789	Y	RE	—	—
LEAD_MFG	Implantable lead manufacturer	The manufacturer of the lead.	Enum	N/A	—	ENUM_MFG	1.0.0	BSX	Y	RE	—	—
LEAD_IMPLANT_DT	Implantable lead implant date	The implant date of the lead.	Date/Time	N/A	—	—	1.0.0	20090121	—	—	—	—
LEAD_POLARITY_TYPE	Implantable lead polarity type	The number of electrodes on the lead.	Enum	N/A	—	ENUM_LEAD_POLARITY_TYPE	1.0.0	BI	—	—	—	—
LEAD_LOCATION	Implantable lead location	The fixation location of the lead, usually indicating a chamber of the heart.	Enum	N/A	—	ENUM_LEAD_LOCATION_CHAMBER	1.0.0	RV	—	—	—	—
LEAD_LOCATION_DETAIL_1	Implantable lead location detail 1	The first word of a combination of words describing further details of the location.	Enum	N/A	—	ENUM_LEAD_LOCATION_DETAIL_1	1.0.0	Apex	—	—	—	—
LEAD_LOCATION_DETAIL_2	Implantable lead location detail 2	The second word of a combination of words describing further details of the location.	Enum	N/A	—	ENUM_LEAD_LOCATION_DETAIL_2	1.0.0	not used in this example	—	—	—	—
LEAD_LOCATION_DETAIL_3	Implantable lead location detail 3	The third word of a combination of words describing further details of the location.	Enum	N/A	—	ENUM_LEAD_LOCATION_DETAIL_3	1.0.0	not used in this example	—	—	—	—
LEAD_CONNECTION_STATUS	Implantable lead connection status	The physical connection status of the lead, either connected or abandoned.	Enum	N/A	—	ENUM_LEAD_STATUS	1.0.0	Connected	—	—	—	—
LEAD_SPECIAL_FUNCTION	Implantable lead special function	A description of any special attribute or function of the lead.	String	20	—	—	1.0.0	incl. p-sensor	—	—	—	—
LEAD_ADVISORY_INFO_STATUS	Implantable Lead Advisory Information Status	This is an indication of the availability or status of advisory information of the lead.	Enum	N/A	—	ENUM_ADVISORY_STATUS	1.1.0	Unknown	—	RE	—	—
LEAD_ADVISORY_INFO	Implantable Lead Advisory Information	Advisory information summary text for the given lead type or serial number.	String	100	—	—	1.1.0	—	—	—	—	—
LEAD_ADVISORY_INFO_URL	Implantable Lead Advisory Information URL	URL to advisory information for the given lead type or serial number.	String	255	—	—	1.1.0	—	—	—	—	—
LEAD_UNIQUE_ID	Implantable Lead Unique ID	A unique identifier for the lead (e.g., UDI) that is unique throughout the world and is from an accredited issuing agency.	String	100	—	—	1.1.0	(01)0080252652348 9(17)200821(21)502 0304789	—	—	—	CC6
LEAD_UNIQUE_ID_ISSUER	Implantable Lead Unique ID Issuer	The accredited issuing agency for the lead unique ID.	String	40	—	—	1.1.0	GS1	—	—	—	CC6
SESS	Interrogation session	The group of session attributes.	GROUP	—	—	—	—	—	—	—	1..1	—
SESS_DTM	Date time interrogation session	The date and time of the in-clinic or remote interrogation session.	Date/Time	N/A	—	—	1.0.0	20090525095530	—	R	—	—
SESS_TYPE	Type interrogation session	The type of device interaction that generated the current data set.	Enum	N/A	—	ENUM_SESS_TYPE	1.0.0	RemoteDeviceInitiated	—	R	—	—
SESS_REPROGRAMMED	Reprogrammed during session	The indication of whether the device was reprogrammed during the session.	Enum	N/A	—	ENUM_SESS_REPROGRAMMED	1.0.0	NO	—	—	—	—

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC_IDC "	Ver	Example value	K	O	C	CC
SESS_DTM_PREVIOUS	Date time previous interrogation session	The date and time of a previous in-clinic or remote interrogation.	Date/Time	N/A	—	—	1.0.0	20090515095530	—	—	—	—
SESS_TYPE_PREVIOUS	Type previous interrogation session	The type of device interaction of the previous interrogation.	Enum	N/A	—	ENUM_SESS_TYPE	1.0.0	InClinic	—	—	—	—
SESS_REPROGRAMMED_PREVIOUS	Reprogrammed during previous session	The indication of whether the device was reprogrammed along with the previous interrogation.	Enum	N/A	—	ENUM_SESS_REPROGRAMMED	1.0.0	YES	—	—	—	—
SESS_CLINICIAN_NAME	Clinician name	The name of the clinician that is responsible for the examination.	String	50	—	—	1.0.0	Mrs. Monitor	—	—	—	—
SESS_CLINICIAN_CONTACT_INFORMATION	Clinician contact information	The contact information for the responsible clinician.	String	100	—	—	1.0.0	Phone: 123456789	—	—	—	—
SESS_CLINIC_NAME	Clinic name	The name of the clinic where the examination took place.	String	50	—	—	1.0.0	Super FU clinic	—	—	—	—
MSMT	Measurements	The group of measurement attributes.	GROUP	-	—	—	—	—	—	—	0..1	—
MSMT_DTM_[STR END]	Measurement date time	The date and time of a discrete or a group of measurements.	Date/Time	N/A	—	—	1.0.0	20090525095010	—	—	—	—
MSMT_BATTERY	Battery measurements	The group of battery measurement attributes.	GROUP	-	—	—	—	—	—	—	0..N	—
MSMT_BATTERY_DTM	Battery date time of measurements	The date and time of the battery measurements.	Date/Time	N/A	—	—	1.0.0	20090525095010	—	—	—	—
MSMT_BATTERY_STATUS	Battery status	The different stages of battery depletion.	Enum	N/A	—	ENUM_BATTERY_STATUS	1.0.0	BOS	—	—	—	—
MSMT_BATTERY_VOLTAGE	Battery voltage	The measured battery voltage.	Numeric	F6.2	V	—	1.0.0	6.2	—	—	—	—
MSMT_BATTERY_IMPEDANCE	Battery impedance	The measured battery impedance.	Numeric	F6.3	Ohm	—	1.0.0	2450	—	—	—	—
MSMT_BATTERY_REMAINING_LONGEVITY	Battery remaining longevity	The estimated duration of battery operation remaining (in months).	Numeric	F6.0	mo	—	1.0.0	38	—	—	—	—
MSMT_BATTERY_REMAINING_PERCENTAGE	Battery remaining percentage	The estimated amount of battery capacity remaining (in percent).	Numeric	F3.1	%	—	1.0.0	—	—	—	—	—
MSMT_BATTERY_RRT_TRIGGER	Battery RRT Trigger	The criteria for determining battery end of service condition.	String	199	—	—	1.0.0	Battery capacity < limit for 3 months	—	—	—	—
MDC_IDC_MSMT_BATTERY_REMAINING_LONGEVITY_TIMEFRAME	Battery Remaining Longevity Timeframe	The end of the time period for which the estimated battery remaining longevity is calculated.	Enum	N/A	—	ENUM_BATTERY_STATUS	1.1.0	RRT	—	—	—	CC8
MDC_IDC_MSMT_BATTERY_REMAINING_PERCENTAGE_TIMEFRAME	Battery Remaining Percentage Timeframe	The end of the time period for which the estimated battery remaining percentage is calculated.	Enum	N/A	—	ENUM_BATTERY_STATUS	1.1.0	RRT	—	—	—	CC8
MDC_IDC_MSMT_BATTERY_RRT_REACHED_DATE	Battery RRT Reached Date Time	The date and time when the implanted device reached RRT.	Date/Time	N/A	—	—	1.1.0	202204081018	—	—	—	—

Table A.2—Base terms^a

Reference ID Prepend "MDC IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC IDC "	Ver	Example value	K	O	C	CC
MSMT_CAP	Capacitor measurements	The group of capacitor measurement attributes.	GROUP	-	—	—	—	—	—	—	0..N	—
MSMT_CAP_CHARGE_DTM	Capacitor last charge date time	The date and time of the capacitor charge.	Date Time	N/A	—	—	1.0.0	20090501095010	—	—	—	—
MSMT_CAP_CHARGE_TIME	Capacitor charge time	The duration in seconds of the capacitor charge.	Numeric	F6.1	s	—	1.0.0	9.4	—	—	—	—
MSMT_CAP_CHARGE_ENERGY	Capacitor charge energy	The amount of energy stored after the capacitor charge.	Numeric	F4.0	J	—	1.0.0	30	—	—	—	—
MSMT_CAP_CHARGE_TYPE	Capacitor charge type	The type of the capacitor charge.	Enum	N/A	—	ENUM_CHARGE_TYPE	1.0.0	Reformation	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]	Lead channel measurements	The group of measurement attributes per a given chamber.	GROUP	—	—	—	—	—	—	—	0..1	—
MSMT_LEADCHNL_I[CHAMBER]_DTM[STRTEND]	Lead channel measurements date and time	The date and time of the lead channel measurements.	Date Time	N/A	—	—	1.0.0	20090501095010	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_LEAD_CHANNEL_STATUS	Lead channel status	The indication whether to check the lead.	Enum	N/A	—	ENUM_CHANNEL_STATUS	1.0.0	CheckLead	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_SENSING	Lead channel sensing measurements	The group of sensing measurement attributes per a given chamber.	GROUP	—	—	—	—	—	—	—	0..1	—
MSMT_LEADCHNL_I[CHAMBER]_SENSING_INTR_AMPL_IM[MJ]	Lead channel sensing intrinsic amplitude	The measured amplitude of the intrinsic cardiac signal.	Numeric	F3.2	mV	—	1.0.0	2.8	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_SENSING_POLARITY	Lead channel sensing polarity	The type of polarity used for the intrinsic amplitude measurement.	Enum	N/A	—	ENUM_POLARITY	1.0.0	BI	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_PACING_THRESHOLD	Lead channel pacing threshold measurements	The group of pacing threshold measurement attributes per a given chamber.	GROUP	—	—	—	—	—	—	—	0..1	—
MSMT_LEADCHNL_I[CHAMBER]_PACING_THRESHOLD_AMPLITUDE	Lead channel pacing threshold amplitude	The minimum pulse amplitude needed for pacing capture for a given pulse width.	Numeric	F3.3	V	—	1.0.0	0.8	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_PACING_THRESHOLD_PULSEWIDTH	Lead channel pacing threshold pulse width	The pulse width that was applied when determining the pacing threshold amplitude.	Numeric	F3.2	ms	—	1.0.0	0.5	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_PACING_THRESHOLD_MEASUREMENT_METHOD	Lead channel pacing threshold measurement method	The method that was used to obtain the pacing threshold.	Enum	N/A	—	ENUM_MEASUREMENT_METHOD	1.0.0	DeviceAutomatic	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_PACING_THRESHOLD_POLARITY	Lead channel pacing threshold polarity	The type of lead polarity that was used for the pacing threshold measurement.	Enum	N/A	—	ENUM_POLARITY	1.0.0	BI	—	—	—	—
MSMT_LEADCHNL_I[CHAMBER]_IMPEDANCE	Lead channel impedance measurements	The group of impedance measurement attributes per a given chamber.	GROUP	—	—	—	—	—	—	—	0..1	—

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC_IDC "	Ver	Example value	K	O	C	CC
MSMT_LEADCHNL_[CHAMBER] RL IMPEDANCE_VALUE	Lead channel impedance value	The sum of the impedances of the lead wires and the electrode-myocardial interface.	Numeric	F6.0	Ohm	—	1.0.0	530	—	—	—	—
MSMT_LEADCHNL_[CHAMBER] RL IMPEDANCE_POLARITY	Lead channel impedance polarity	The type of lead polarity used for measuring the lead impedance.	Enum	N/A	—	ENUM_POLARITY	1.0.0	BI	—	—	—	—
MSMT_LEADHVCHNL	Lead high voltage channel measurements	The group of high voltage channel measurement attributes.	GROUP	—	—	—	—	—	—	—	0..N	—
MSMT_LEADHVCHNL_DTM_[S TRTEND]	Lead high voltage channel date time	The date and time of the high voltage lead channel measurements.	Date Time	N/A	—	—	1.0.0	20090501095010	—	—	—	—
MSMT_LEADHVCHNL_IMPEDI ANCE	Lead high voltage channel impedance	The sum of the impedances of the shock lead wires and the electrode-myocardial interface.	Numeric	F6.0	Ohm	—	1.0.0	47	—	—	—	—
MSMT_LEADHVCHNL_MEASU REMENT_TYPE	Lead high voltage channel measurement type	The electric pulse type used for measuring the shock lead impedance.	Enum	N/A	—	ENUM_HVCHNL_MEASUREMEN T_TYPE	1.0.0	LowVoltage	—	—	—	—
MSMT_LEADHVCHNL_STATU S	Lead high voltage channel status	The indication whether to check the high voltage lead.	Enum	N/A	—	ENUM_CHANNEL_STATUS	1.0.0	Null	—	—	—	—
SET	Settings	The group of settings.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_CRT	CRT settings	The group of CRT settings.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_CRT_LVRV_DELAY	CRT LV-RV delay	The interval from the first left ventricular pace to a right ventricular pace (positive values indicate LV is first).	Numeric	F4.0	ms	—	1.0.0	10	—	—	—	—
SET_CRT_PACED_CHAMBER S	Ventricular chambers paced during CRT pacing.	The ventricular chambers paced during CRT pacing.	Enum	N/A	—	ENUM_CRT_PACED_CHAMBER S	1.0.0	BIV	—	—	—	—
SET_CRT_MULTISITE_PACIN G_STATUS	CRT Multisite Pacing Status	The status of a multisite pacing feature.	Enum	N/A	—	ENUM_CRT_MULTISITE_PACIN G_STATUS	1.1.0	On	—	—	—	—
SET_CRT_MULTISITE_PACIN G_LV_LV_DELAY	CRT Multisite LV-LV Delay	The interval from the first paced ventricular event to a second paced ventricular event. The interval can be zero or greater.	Numeric	F4.0	ms	—	1.1.0	30	—	—	—	—
SET_MAGNET	Magnet settings	The group of magnet settings.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_MAGNET_RESP	Magnet response	A description of how the device responds to a magnet.	String	199	—	—	1.0.0	Therapies inactive, VVIR	—	—	—	—
SET_LEADCHNL_[CHAMBER]	Lead channel settings	The group of settings per a given chamber.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_LEADCHNL_[CHAMBER] SENSING	Lead channel settings sensing	The group of sensing settings per a given chamber.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_LEADCHNL_[CHAMBER] SENSING_SENSITIVITY	Lead channel setting sensing sensitivity	The smallest electrical signal programmed to be detected by the device's sensing circuitry.	Numeric	F3.2	mV	—	1.0.0	0.8	—	—	—	—
SET_LEADCHNL_[CHAMBER] SENSING_POLARITY	Lead channel setting sensing polarity	The indication of unipolar or bipolar configuration for sensing.	Enum	N/A	—	ENUM_POLARITY	1.0.0	BI	—	—	—	—

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC_IDC "	Ver	Example value	K	O	C	CC
SET_LEADCHNL_[CHAMBER] SENSING_ANODE_LOCATION _ [1..3]	Lead channel setting sensing anode location	The location of the electrodes that define the sensing vector's anode, noting that sensing is polarity neutral. An anode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.0.0	RV	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] SENSING_ANODE_ELECTRO DE_ [1..3]	Lead channel setting sensing anode terminal	The type of the electrodes that define the sensing vector's anode, noting that sensing is polarity neutral. An anode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.0.0	Tip	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] SENSING_CATHODE_LOCATI ON_ [1..3]	Lead channel setting sensing cathode location	The location of the electrodes that define the sensing vector's cathode, noting that sensing is polarity neutral. A cathode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.0.0	RV	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] SENSING_CATHODE_ELECTR ODE_ [1..3]	Lead channel setting sensing cathode terminal	The type of the electrodes that define the sensing vector's cathode, noting that sensing is polarity neutral. A cathode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.0.0	Ring	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] SENSING_ADAPTATION_MOD E	Lead channel setting sensing adaptation mode	Specifies whether the sensitivity is fixed or adapting.	Enum	N/A	—	ENUM_SENSING_ADAPTATION_ MODE	1.0.0	AdaptiveSensing	—	—	—	—
SET_LEADCHNL_[CHAMBER] PACING	Lead channel settings pacing	The group of pacing settings per a given chamber.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_LEADCHNL_[CHAMBER] PACING_AMPLITUDE	Lead channel setting pacing amplitude	The pacing output amplitude.	Numeric	F3.3	V	—	1.0.0	3.2	—	—	—	—
SET_LEADCHNL_[CHAMBER] PACING_PULSEWIDTH	Lead channel setting pacing pulse width	The pacing output pulse width.	Numeric	F3.2	ms	—	1.0.0	0.5	—	—	—	—
SET_LEADCHNL_[CHAMBER] PACING_POLARITY	Lead channel setting pacing polarity	The indication of unipolar or bipolar configuration for pacing.	Enum	N/A	—	ENUM_POLARITY	1.0.0	BI	—	—	—	—
SET_LEADCHNL_[CHAMBER] PACING_ANODE_LOCATION_ [1..3]	Lead channel setting pacing anode location	The location of the electrodes that define the pacing vector's anode. An anode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.0.0	RV	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] PACING_ANODE_ELECTROD E_ [1..3]	Lead channel setting pacing anode terminal	The type of the electrodes that define the pacing vector's anode. An anode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.0.0	Tip	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] PACING_CATHODE_LOCATIO N_ [1..3]	Lead channel setting pacing cathode location	The location of the electrodes that define the pacing vector's cathode. A cathode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.0.0	RV	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] PACING_CATHODE_ELECTRO DE_ [1..3]	Lead channel setting pacing cathode terminal	The type of the electrodes that define the pacing vector's cathode. A cathode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.0.0	Ring	—	—	—	CC1

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC_IDC " ENUM_PACING_CAPTURE_MOD E	Ver	Example value	K	O	C	CC
SET_LEADCHNL_[CHAMBER] PACING_CAPTURE_MODE	Lead channel setting pacing capture mode	The method the device uses for managing pacing capture.	Enum	N/A	—	—	1.0.0	AdaptiveCapture	—	—	—	—
SET_LEADCHNL_[CHAMBER] BLANKING_REFRACTORY	Lead Channel Setting Blanking Refractory	The group of blanking and refractory period settings.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_LEADCHNL_[CHAMBER] BLANKING_AFTER_[PACE_SE NSE]_HIGH	See Annex H. If not listed in the annex, display "[CHAMBER] blanking interval after [PACE_SENSE] High"	The high setting for pacemaker blanking. A pacemaker will mark and handle sensed events inside the refractory interval as refractory events. Refractory senses are usually ignored for the brady pacemaker timing but may still be used for tachycardia detection whereas a sensed event inside the blanking interval will usually be fully ignored by the device.	Numeric	F3.0	ms	—	1.1.0	30	—	—	—	—
SET_LEADCHNL_[CHAMBER] REFRACTORY_AFTER_[PACE _SENSE]_HIGH	See Annex H. If not listed in the annex, display "[CHAMBER] refractory interval after [PACE_SENSE] High"	The high setting for pacemaker refractory. A pacemaker will mark and handle sensed events inside the refractory interval as refractory events. Refractory senses are usually ignored for the brady pacemaker timing but may still be used for tachycardia detection whereas a sensed event inside the blanking interval will usually be fully ignored by the device.	Numeric	F3.0	ms	—	1.1.0	30	—	—	—	—
SET_LEADCHNL_[CHAMBER] BLANKING_AFTER_[PACE_SE NSE]_LOW	See Annex H. If not listed in the annex, display "[CHAMBER] blanking interval after [PACE_SENSE] Low"	The low setting for pacemaker blanking. A pacemaker will mark and handle sensed events inside the refractory interval as refractory events. Refractory senses are usually ignored for the brady pacemaker timing but may still be used for tachycardia detection whereas a sensed event inside the blanking interval will usually be fully ignored by the device.	Numeric	F3.0	ms	—	1.1.0	30	—	—	—	—

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC_IDC "	Ver	Example value	K	O	C	CC
SET_LEADCHNL_[CHAMBER]_REFRACTORY_AFTER_[PACE_SENSE]_LOW	See Annex H. If not listed in the annex, display "[CHAMBER] refractory interval after [PACE_SENSE] Low"	The low setting for pacemaker refractory. A pacemaker will mark and handle sensed events inside the refractory interval as refractory events. Refractory senses are usually ignored for the brady pacemaker timing but may still be used for tachycardia detection whereas a sensed event inside the blanking interval will usually be fully ignored by the device.	Numeric	F3.0	ms	—	1.1.0	30	—	—	—	—
SET_LEADCHNL_[CHAMBER]_BLANKING_AFTER_[PACE_SENSE]_ADAPTATION_MODE	See Annex H + "Adaptation Mode". If not listed in the annex, display "[CHAMBER] refractory interval after [PACE_SENSE] Adaptation Mode"	The adaptation mode of the associated blanking interval indicating whether the interval is fixed or adapting (e.g., with heart rate).	Enum	N/A	—	ENUM_BLANKING_REFRACTOR_Y_ADAPTATION_MODE	1.1.0	Off	—	—	—	—
SET_LEADCHNL_[CHAMBER]_REFRACTORY_AFTER_[PACE_SENSE]_ADAPTATION_MODE_E	See Annex H + "Adaptation Mode". If not listed in the annex, display "[CHAMBER] refractory interval after [PACE_SENSE] Adaptation Mode"	The adaptation mode of the associated refractory interval indicating whether the interval is fixed or adapting (e.g., with heart rate).	Enum	N/A	—	ENUM_BLANKING_REFRACTOR_Y_ADAPTATION_MODE	1.1.0	Off	—	—	—	—
SET_LEADCHNL_LV_PACING2	LV Multisite Lead Channel Settings Pacing	The group of LV Multisite pacing settings for the additional vector.	GROUP	—	—	—	—	—	—	—	0.1	—
SET_LEADCHNL_LV_PACING2_ANODE_LOCATION_[1..3]	LV Multisite Lead Channel Setting Pacing Anode Location	The location of the electrode that define the LV Multisite second pacing vector's anode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.1.0	LV	—	—	—	CC1
SET_LEADCHNL_LV_PACING2_ANODE_ELECTRODE_[1..3]	LV Multisite Lead Channel Setting Pacing Anode Terminal	The type of the electrode that define the LV Multisite second pacing vector's anode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.1.0	Tip	—	—	—	CC1
SET_LEADCHNL_LV_PACING2_CATHODE_LOCATION_[1..3]	LV Multisite Lead Channel Setting Pacing Cathode Location	The location of the electrode that define the LV Multisite second pacing vector's cathode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.1.0	LV	—	—	—	CC1
SET_LEADCHNL_LV_PACING2_CATHODE_ELECTRODE_[1..3]	LV Multisite Lead Channel Setting Pacing Cathode Terminal	The type of the electrode that define the LV Multisite second pacing vector's cathode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.1.0	Ring3	—	—	—	CC1
SET_LEADCHNL_LV_PACING2_AMPLITUDE	LV Multisite Lead Channel Setting Pacing Amplitude	The pacing output amplitude of the LV Multisite second pacing vector.	Numeric	F3.3	V	—	1.1.0	1.5	—	—	—	—
SET_LEADCHNL_LV_PACING2_PULSEWIDTH	LV Multisite Lead Channel Setting Pacing Pulse Width	The pacing output pulse width of the LV Multisite second pacing vector.	Numeric	F3.2	ms	—	1.1.0	0.5	—	—	—	—

Table A.2—Base terms^a

Reference ID Prepend "MDC_IDC "	Display name	Definition	Type	Format	Unit of measure	Enumeration Group Prepend " MDC_IDC "	Ver	Example value	K	O	C	CC
SET_LEADHVCHNL	Lead high voltage channel setting	The group of high voltage settings.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_LEADHVCHNL_SHOCK_V ECTOR	Lead high voltage channel setting shock vector	The group of high voltage shock vector settings.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_LEADHVCHNL_SHOCK_V ECTOR_ANODE_LOCATION_I _1..3]	Lead high voltage channel setting shock vector anode location	The location of the anode electrode that defines the shocking vector for the lead. An anode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.0.0	RV	—	—	—	CC1
SET_LEADHVCHNL_SHOCK_V ECTOR_ANODE_ELECTRO DE_I_1..3]	Lead high voltage channel setting shock vector anode terminal	The anode electrode terminal that defines the shocking vector for the lead. An anode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.0.0	Coil	—	—	—	CC1
SET_LEADHVCHNL_SHOCK_V ECTOR_CATHODE_LOCATIO N_I_1..3]	Lead high voltage channel setting shock vector cathode location	The location of the cathode electrode that defines the shocking vector for the lead. A cathode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_LOCATION	1.0.0	N/A	—	—	—	CC1
SET_LEADHVCHNL_SHOCK_V ECTOR_CATHODE_ELECTRO DE_I_1..3]	Lead high voltage channel setting shock vector cathode terminal	The cathode electrode terminal that defines the shocking vector for the lead. A cathode may consist of more than one electrode.	Enum	N/A	—	ENUM_ELECTRODE_NAME	1.0.0	Can	—	—	—	CC1
SET_BRADY	Brady settings	The group of brady therapy settings.	GROUP	—	—	—	—	—	—	—	0..1	—
SET_BRADY_MODE	Brady setting mode (NBG code)	The brady pacing mode according to the NBG standard.	Enum	N/A	—	ENUM_BRADY_MODE	1.0.0	DDDR	—	—	—	—
SET_BRADY_VENDOR_MODE	Brady setting mode (vendor specific)	The brady pacing mode as defined by vendor-specific codes.	String	20	—	—	1.0.0	DDI-CLS	—	—	—	—
SET_BRADY_LOWRATE	Brady setting lower rate limit	The rate at which the device paces in the absence of a cardiac rhythm faster than the lower rate and without influence from features that can affect the pacing rate.	Numeric	F3.0	{beats}/mi n	—	1.0.0	60	—	—	—	—
SET_BRADY_HYSTRATE	Brady setting hysteresis rate	The lower rate for the hysteresis feature.	Numeric	F3.0	{beats}/mi n	—	1.0.0	55	—	—	—	—
SET_BRADY_NIGHT_RATE	Brady setting night rate	The lower rate for the night rate feature.	Numeric	F3.0	{beats}/mi n	—	1.0.0	50	—	—	—	—
SET_BRADY_SENSOR_TYPE	Brady setting sensor type	The type of sensor applied for rate adaptive pacing.	String	20	—	—	1.0.0	Acceleration and CLS	—	—	—	—
SET_BRADY_MAX_TRACKING RATE	Brady setting maximum tracking rate	The fastest atrial rate at which ventricular pacing occurs with 1:1 synchrony.	Numeric	F3.0	{beats}/mi n	—	1.0.0	140	—	—	—	—
SET_BRADY_MAX_SENSOR_ RATE	Brady setting maximum sensor rate	The fastest sensor-driven pacing rate that can be achieved in a rate-adaptive pacing system.	Numeric	F3.0	{beats}/mi n	—	1.0.0	120	—	—	—	—
SET_BRADY_SAV_DELAY_IHI GLOW]	Brady setting SAV delay	The interval from an intrinsic (sensed) P wave to a paced ventricular event.	Numeric	F4.0	ms	—	1.0.0	120	—	—	—	—