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**Health informatics — Point-of-care
medical device communication —**

**Part 10103:
Nomenclature — Implantable device,
cardiac**

*Informatique de santé — Communication entre dispositifs médicaux sur
le site des soins*

Partie 10103: Nomenclature — Dispositif implantable, cardiaque



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ISO/IEEE 11073 consists of the following parts, under the general title *Health informatics — Personal health device communication* (text in parentheses gives a variant of subtitle):

- *Part 00103: Overview*
- *Part 10101: (Point-of-care medical device communication) Nomenclature*
- *Part 10102: (Point-of-care medical device communication) Nomenclature — Annotated ECG*
- *Part 10103: (Point-of-care medical device communication) — Nomenclature — Implantable device, cardiac*
- *Part 10201: (Point-of-care medical device communication) Domain information model*
- *Part 10404: Device specialization — Pulse oximeter*

- *Part 10406: Device specialization — Basic electrocardiograph (ECG) (1- to 3-lead ECG)*
- *Part 10407: Device specialization — Blood pressure monitor*
- *Part 10408: Device specialization — Thermometer*
- *Part 10415: Device specialization — Weighing scale*
- *Part 10417: Device specialization — Glucose meter*
- *Part 10418: Device specialization — International Normalized Ratio (INR) monitor*
- *Part 10420: Device specialization — Body composition analyzer*
- *Part 10421: Device specialization — Peak expiratory flow monitor (peak flow)*
- *Part 10441: Device specialization — Cardiovascular fitness and activity monitor*
- *Part 10471: Device specialization — Independent living activity hub*
- *Part 10472: Device specialization — Medication monitor*
- *Part 20101: (Point-of-care medical device communication) Application profiles — Base standard*
- *Part 20601: Application profile — Optimized exchange protocol*
- *Part 30200: (Point-of-care medical device communication) Transport profile — Cable connected*
- *Part 30300: (Point-of-care medical device communication) Transport profile — Infrared wireless*
- *Part 30400: (Point-of-care medical device communication) Interface profile — Cabled Ethernet*
- *Part 90101: (Point-of-care medical device communication) Analytical instruments — Point-of-care test*
- *Part 91064: (Standard communication protocol) Computer-assisted electrocardiography*
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Health informatics—Point-of-care medical device communication

Part 10103: Nomenclature—Implantable device, cardiac

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Health informatics—Point-of-care medical device communication

Part 10103: Nomenclature—Implantable device, cardiac

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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 (CRT), codes, follow-up, home monitoring, IEEE 11073-10103, implantable cardioverter defibrillator (ICD), implantable devices, medical device communication, nomenclature, pacemaker, remote follow-up, remote monitoring, terminology

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Introduction

This introduction is not part of IEEE Std 11073-10103-2012, Health informatics—Point-of-care medical device communication—Part 10103: 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). Currently, no such standardization exists, typically resulting in the reports being managed as paper documents and not electronically.

Given the lack of standardization in this domain, 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.

NOTE—The XML Schema, XSLT transforms and XML data files contained in Annex H are available at the following URL: <http://standards.ieee.org/downloads/11073/11073-10103-2012/>.

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Health informatics—Point-of-care medical device communication

Part 10103: Nomenclature—Implantable device, cardiac

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1. Overview

1.1 Scope

This standard extends the base nomenclature provided in ISO/IEEE 11073-10101:2004¹ 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 discrete 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]²) or with other standards, such as Health Level Seven International (HL7).

¹ Information on references can be found in Clause 2.

² The numbers in brackets correspond to those of the bibliography in Annex I.

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 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

1.4 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 that 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.

ISO/IEEE 11073-10101:2004, Health informatics—Point-of-care medical device communication—Part 10101: Nomenclature.³

The Unified Code for Units of Measure (UCUM), version 1.8.⁴

³ ISO/IEC publications are available from the ISO Central Secretariat (<http://www.iso.org/>). ISO publications are also available in the United States from the American National Standards Institute (<http://www.ansi.org/>).

⁴ UCUM is available at <http://aurora.regenstrief.org/~ucum/ucum.html>. An overview and useful supporting information are available at <http://unitsofmeasure.org/>.

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.⁵

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.

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.*

⁵The *IEEE Standards Dictionary Online* subscription is available at http://www.ieee.org/portal/innovate/products/standard/standards_dictionary.html.

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 enumerations: Vendor-specific enumerated values for a term.

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

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), or devices for cardiac resynchronization therapy (CRT).

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.

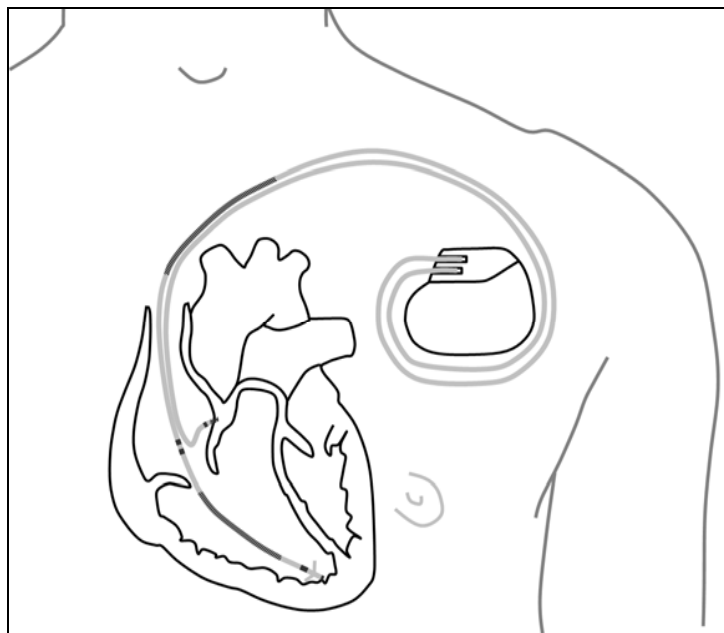
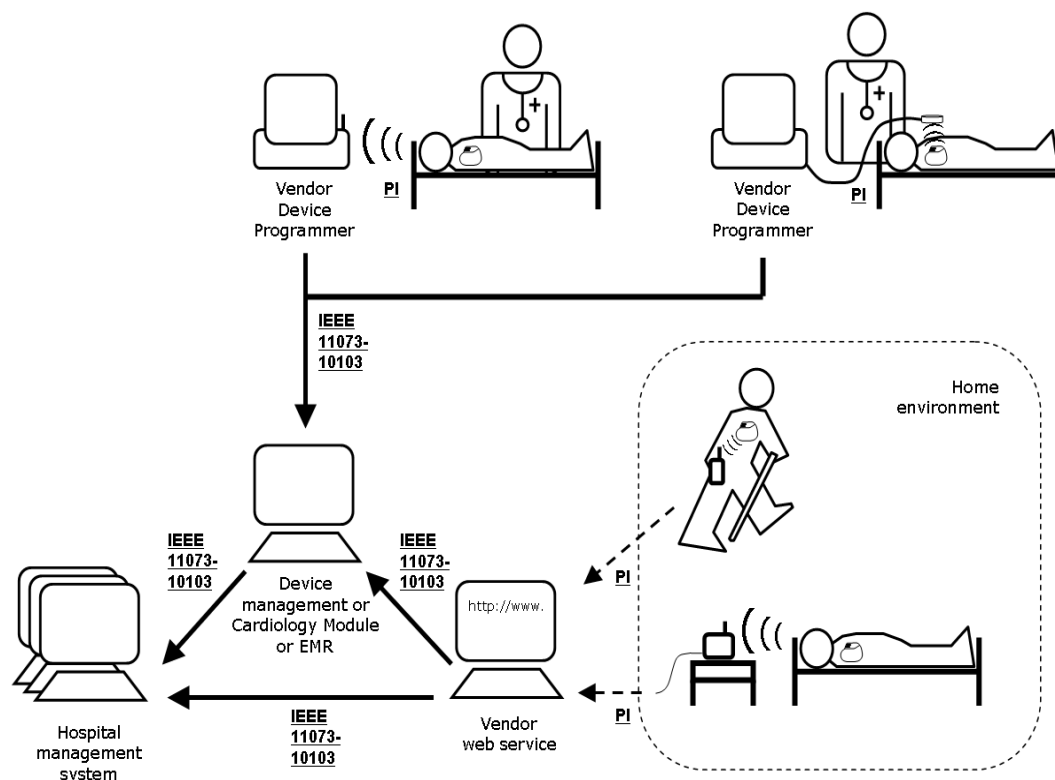


Figure 1—Pulse generator/leads

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.



IEEE 11073-10103 – Interface based on IEEE 11073-10103 nomenclature
PI – Proprietary interface

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 regards 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 avoid 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 additional semantic refinement that can be applied to multiple terms. Discriminators are used to manage complexity within the containment hierarchy and can be applied at any node within the containment hierarchy. They are represented in the nomenclature models and lists using square brackets and a text token, e.g., [Token]. The token of the discriminator is expanded using a defined set of text values that are semantically significant to the resulting term identifier. Discriminator token sets for the containment hierarchy are defined in tables below and are referenced by token name. For example, the node LEADCHNL has the discriminator [CHAMBER] postfixed. The token CHAMBER will be expanded using the set of heart chambers (right atrium [RA], right ventricle [RV], left atrium [LA], and left ventricle [LV]) resulting in LEADCHNL_RA, LEADCHNL_RV, LEADCHNL_LA, and LEADCHNL_LV.

A term is uniquely identified by a Reference ID, Systematic Name and Code according to the scheme described in ISO/IEEE 11073-10101:2004. 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 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.

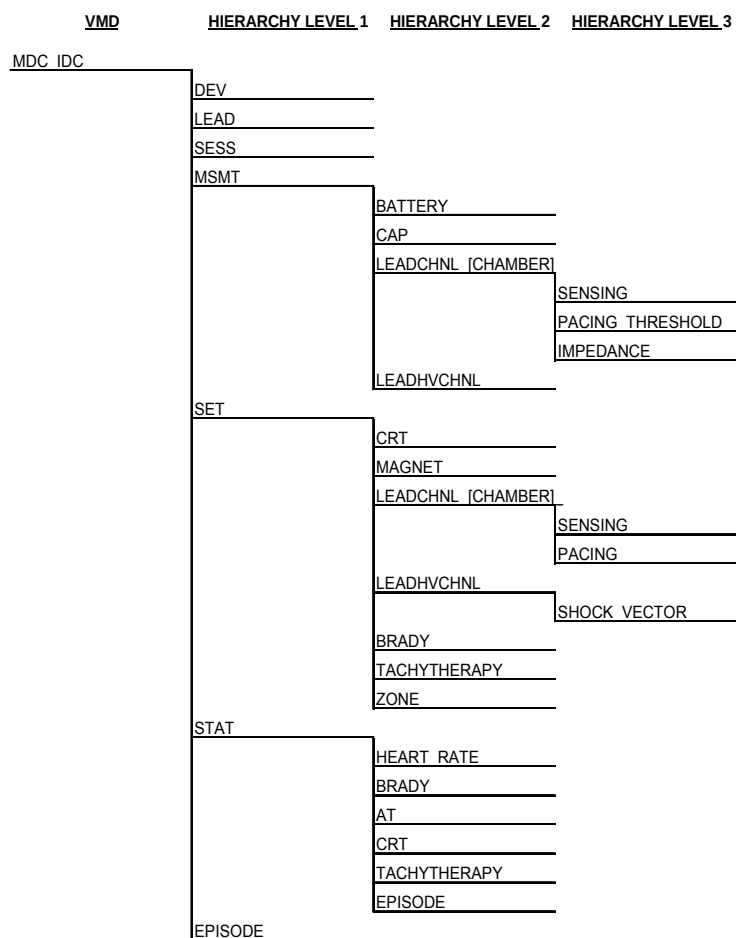


Figure 3—11073-10103 containment hierarchy

6.2 Highest level containment nodes

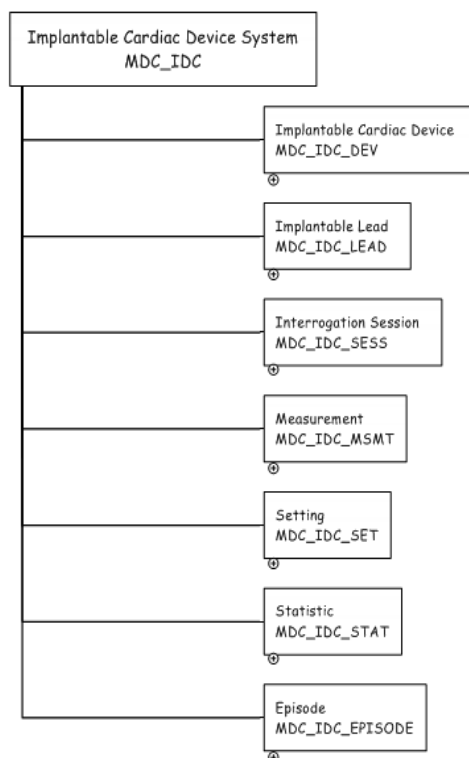


Figure 4—Highest level containment nodes

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	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.
Setting	SET	Device settings that determine device behavior.
Statistic	STAT	Aggregate statistics concerning the device or patient conditions.
Episode	EPISODE	Device sensed episodes.

6.2.1 Measurement nodes

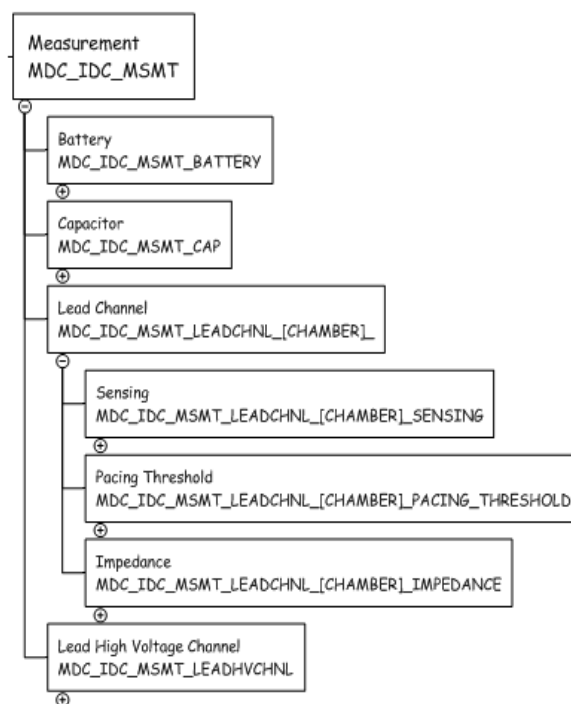


Figure 5—Measurement nodes

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 Setting nodes

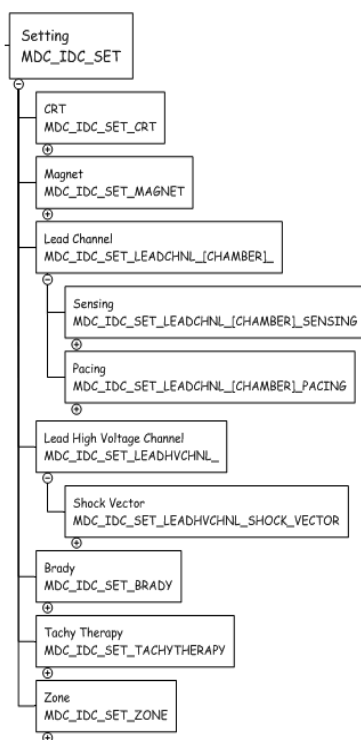


Figure 6—Setting nodes

Table 3—Setting 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.
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 Statistic nodes

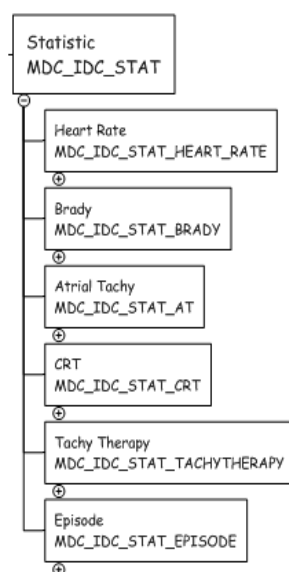


Figure 7—Statistic nodes

Table 4—Statistic 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 discriminator [CHAMBER] was 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 discriminator was 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 token	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 general term enumeration?	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	—	-Optional- Does the implementation have strict adherence to the IEEE 11073-10103 informative constraints for vendor enumerations?	Yes/No (No implies non-Level II conformance)	
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

Normative specifications for term identifiers in this standard are immutable. Identifiers will never be retired or reused.

All other constraints and text within the standard can be revised. The standard will 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 will incur a revision and new version number.

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

- The major version number—This is the leftmost integer value in a sequence of three such values separated by periods. The major version number will only be increased when beginning work toward a version with significant changes that impact backward compatibility.
- The minor version number—This is the middle integer value in a sequence of three such values separated by periods. The minor version number will be increased when beginning work toward a version with incremental additions, improvements, or fixes over the last version.
- The point version number—This is the third integer in a sequence of three such values separated by periods. The point version number is increased for vendor-specific versions. Point or vendor-specific versions are not normative. If used, then it should be followed by version qualifier string described below. The point version numbers will always be “0” for the balloted normative standard.
- The version qualifier string—This is a human readable string (ideally consisting only of ASCII letters, digits, periods, and dashes) that uniquely identifies the vendor making a point revision. It should be and is only included in the version identifier for point versions. It should be consistent for subsequent point releases by the same vendor. Point or vendor versions are not considered normative.

An example version number could be “1.02.03_vendor” where “1” is the major version number, “02” is the minor version number, “03” is the point version number, and “_vendor” is the version qualifier string.

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 11073-10101:2004 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 Version

All terms are version 1.0.0 for this initial release of the nomenclature.

A.3 Base term attributes

A.3.1 Reference identifier

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

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

A.3.2 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.

A.3.3 Definition

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

A.3.4 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-hour clock notation.
- Enum (Enumerated)—Specifies a string whose value is of a defined set of string values. Lists of allowed values for enumerated terms are listed in Annex C.

- 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 ASCII characters except the defined control characters. Strings are left justified with trailing blanks optional.

For containment nodes, the data type is always GROUP.

A.3.5 Format

The data format for a specific data type. 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.3.6 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.

Table A.1—Units of measure

Unit_of_Measure	Symbol	Description
Percent	%	Standard UCUM
Volts	V	Standard UCUM
Millivolts	mV	Standard UCUM
Ohms	Ohm	Standard UCUM
Joules	J	Standard UCUM
Minutes	min	Standard UCUM
Milliseconds	ms	Standard UCUM
Seconds	s	Standard UCUM
Hours	h	Standard UCUM
Months	mo	Standard UCUM
Sequences	{seq}	Number of sequences.
Shocks	{shocks}	Number of therapy shocks.
Mode switches	{switches}	Number of mode switches.
Heartbeats	{beats}	Number of heartbeats.
Heartbeats per minute	{beats}/min	Number of heartbeats per minute.

A.3.7 Enumerator identifier

The enumerator identifier that refers to a set of enumerations for a term of the type enumerator. Tables that list enumerations for specific enumerator identifiers are listed later in this document.

A.4 Partition details

ISO/IEEE 11073-10101:2004 has been assigned a 32-bit code space that contains multiple partitions. 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, enumerations, and vendor-specific extensions. The first half of the partition is used for normative terms, the next quarter for normative enumerations, and the last quarter for vendor-specific extensions. 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 B through Annex D.

A.5 Table of base terms

Table A.2—Base terms^a

Reference ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements. ^b)	Display name	Definition	Type	Format	Unit of measure	Enumerator ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements.)	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	—	R	—	—
DEV_MODEL	Implantable cardiac device model	The model identifier of a cardiac device.	String	50	—	—	Y	R	—	—
DEV_SERIAL	Implantable cardiac device serial number	The serial number of a cardiac device.	String	40	—	—	Y	R	—	—
DEV_MFG	Implantable cardiac device manufacturer	The manufacturer of the cardiac device.	Enum	N/A	—	ENUM_MFG	Y	R	—	—
DEV_IMPLANT_DT	Implantable cardiac device implant date	The implant date of the cardiac device.	Date/Time	N/A	—	—	—	—	—	—
DEV_IMPLANTER	Implantable cardiac device implanter	The name of the physician that implanted the cardiac device.	String	50	—	—	—	—	—	—
DEV_IMPLANTER_CONTACT_INFO	Implantable cardiac device implanter contact information	The contact information of the physician that implanted the cardiac device.	String	100	—	—	—	—	—	—
DEV_IMPLANTING_FACILITY	Implantable cardiac device implanting facility	The facility (clinic/hospital) where the cardiac device was implanted.	String	100	—	—	—	—	—	—
LEAD	Implantable lead attributes	The group of lead attributes.	GROUP	—	—	—	—	—	0..N	—
LEAD_MODEL	Implantable lead model	The model of the lead.	String	50	—	—	Y	RE	—	—
LEAD_SERIAL	Implantable lead serial number	The serial number of the lead.	String	40	—	—	Y	RE	—	—
LEAD_MFG	Implantable lead manufacturer	The manufacturer of the lead.	Enum	N/A	—	ENUM_MFG	Y	RE	—	—
LEAD_IMPLANT_DT	Implantable lead implant date	The implant date of the lead.	Date/Time	N/A	—	—	—	—	—	—
LEAD_POLARITY_TYPE	Implantable lead polarity type	The number of electrodes on the lead.	Enum	N/A	—	ENUM_LEAD_POLARITY _TYPE	—	—	—	—
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	—	—	—	—
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	—	—	—	—
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	—	—	—	—
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	—	—	—	—
LEAD_CONNECTION_STATUS	Implantable lead connection status	The physical connection status of the lead, either connected or abandoned.	Enum	N/A	—	ENUM_LEAD_STATUS	—	—	—	—
LEAD_SPECIAL_FUNCTION	Implantable lead special function	A description of any special attribute or function of the lead.	String	20	—	—	—	—	—	—
SESS	Interrogation session	The group of session attributes.	GROUP	—	—	—	—	—	1..1	—

Table A.2—Base terms^a

Reference ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements. ^b)	Display name	Definition	Type	Format	Unit of measure	Enumerator ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements.)	K	O	C	CC
SESS_DTM	Date time interrogation session	The date and time of the in-clinic or remote interrogation session.	Date/Time	N/A	—	—	—	R	—	—
SESS_TYPE	Type interrogation session	The type of device interaction that generated the current data set.	Enum	N/A	—	ENUM_SESS_TYPE	—	R	—	—
SESS_REPROGRAMMED	Reprogrammed during session	The indication of whether the device was re-programmed during the session.	Enum	N/A	—	ENUM_SESS_REPROGRAMMED	—	—	—	—
SESS_DTM_PREVIOUS	Date time previous interrogation session	The date and time of a previous in-clinic or remote interrogation.	Date/Time	N/A	—	—	—	—	—	—
SESS_TYPE_PREVIOUS	Type previous interrogation session	The type of device interaction of the previous interrogation.	Enum	N/A	—	ENUM_SESS_TYPE	—	—	—	—
SESS_REPROGRAMMED_PREVIOUS	Re-programmed during previous session	The indication of whether the device was reprogrammed along with the previous interrogation.	Enum	N/A	—	ENUM_SESS_REPROGRAMMED	—	—	—	—
SESS_CLINICIAN_NAME	Clinician name	The name of the clinician that is responsible for the examination.	String	50	—	—	—	—	—	—
SESS_CLINICIAN_CONTACT_INFORMATION	Clinician contact information	The contact information for the responsible clinician.	String	100	—	—	—	—	—	—
SESS_CLINIC_NAME	Clinic name	The name of the clinic where the examination took place.	String	50	—	—	—	—	—	—
MSMT	Measurements	The group of measurement attributes.	GROUP	-	—	—	—	—	0..1	—
MSMT_DTM_[STRTEND]	Measurement date time	The date and time of a discrete or a group of measurements.	Date/Time	N/A	—	—	—	—	—	—
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	—	—	—	—	—	—
MSMT_BATTERY_STATUS	Battery status	The different stages of battery depletion.	Enum	N/A	—	ENUM_BATTERY_STATUS	—	—	—	—
MSMT_BATTERY_VOLTAGE	Battery voltage	The measured battery voltage.	Numeric	F6.2	V	—	—	—	—	—
MSMT_BATTERY_IMPEDANCE	Battery impedance	The measured battery impedance.	Numeric	F6.0	Ohm	—	—	—	—	—
MSMT_BATTERY_REMAINING_LONGEVITY	Battery remaining longevity	The estimated amount of battery capacity remaining in months.	Numeric	F6.0	mo	—	—	—	—	—
MSMT_BATTERY_REMAINING_PERCENTAGE	Battery remaining percentage	The estimated amount of battery capacity remaining in percent.	Numeric	F3.1	%	—	—	—	—	—
MSMT_BATTERY_RRT_TRIGGER	Battery RRT Trigger	The criteria for determining battery end of service condition.	String	50	—	—	—	—	—	—
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	—	—	—	—	—	—
MSMT_CAP_CHARGE_TIME	Capacitor charge time	The duration in seconds of the capacitor charge.	Numeric	F6.1	s	—	—	—	—	—
MSMT_CAP_CHARGE_ENERGY	Capacitor charge energy	The amount of energy stored after the capacitor charge.	Numeric	F4.0	J	—	—	—	—	—

Table A.2—Base terms^a

Reference ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements. ^b)	Display name	Definition	Type	Format	Unit of measure	Enumerator ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements.)	K	O	C	CC
MSMT_CAP_CHARGE_TYPE	Capacitor charge type	The type of the capacitor charge.	Enum	N/A	—	ENUM_CHARGE_TYPE	—	—	—	—
MSMT_LEADCHNL_[CHAMBER]	Lead channel measurements	The group of measurement attributes per a given chamber.	GROUP	—	—	—	—	—	0..1	—
MSMT_LEADCHNL_[CHAMBER] _DTM_[STRTEND]	Lead channel measurements date and time	The date and time of the lead channel measurements.	Date/Time	N/A	—	—	—	—	—	—
MSMT_LEADCHNL_[CHAMBER] _LEAD_CHANNEL_STATUS	Lead channel status	The indication whether to check the lead.	Enum	N/A	—	ENUM_CHANNEL_STATUS	—	—	—	—
MSMT_LEADCHNL_[CHAMBER] _SENSING	Lead channel sensing measurements	The group of sensing measurement attributes per a given chamber.	GROUP	—	—	—	—	—	0..1	—
MSMT_LEADCHNL_[CHAMBER] _SENSING_INTR_AMPL_[MMM]	Lead channel sensing intrinsic amplitude	The measured amplitude of the intrinsic cardiac signal.	Numeric	F3.2	mV	—	—	—	—	—
MSMT_LEADCHNL_[CHAMBER] _SENSING_POLARITY	Lead channel sensing polarity	The type of polarity used for the intrinsic amplitude measurement.	Enum	N/A	—	ENUM_POLARITY	—	—	—	—
MSMT_LEADCHNL_[CHAMBER] _PACING_THRESHOLD	Lead channel pacing threshold measurements	The group of pacing threshold measurement attributes per a given chamber.	GROUP	—	—	—	—	—	0..1	—
MSMT_LEADCHNL_[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	—	—	—	—	—
MSMT_LEADCHNL_[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	—	—	—	—	—
MSMT_LEADCHNL_[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	—	—	—	—
MSMT_LEADCHNL_[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	—	—	—	—
MSMT_LEADCHNL_[CHAMBER] _IMPEDANCE	Lead channel impedance measurements	The group of impedance measurement attributes per a given chamber.	GROUP	—	—	—	—	—	0..1	—
MSMT_LEADCHNL_[CHAMBER] _IMPEDANCE_VALUE	Lead channel impedance value	The sum of the impedances of the lead wires and the electrode-myocardial interface.	Numeric	F6.0	Ohm	—	—	—	—	—
MSMT_LEADCHNL_[CHAMBER] _IMPEDANCE_POLARITY	Lead channel impedance polarity	The type of lead polarity used for measuring the lead impedance.	Enum	N/A	—	ENUM_POLARITY	—	—	—	—
MSMT_LEADHVCHNL	Lead high-voltage channel measurements	The group of high-voltage channel measurement attributes.	GROUP	—	—	—	—	—	0..N	—
MSMT_LEADHVCHNL_[DTM _[STRTEND]	Lead high-voltage channel date time	The date and time of the high-voltage lead channel measurements.	Date/Time	N/A	—	—	—	—	—	—
MSMT_LEADHVCHNL_[IMPEDANCE]	Lead high-voltage channel impedance	The sum of the impedances of the shock lead wires and the electrode-myocardial interface.	Numeric	F6.0	Ohm	—	—	—	—	—
MSMT_LEADHVCHNL _MEASUREMENT_TYPE	Lead high-voltage channel measurement type	The electric pulse type used for measuring the shock lead impedance.	Enum	N/A	—	ENUM_HVCHNL_MEASUREMENT_TYPE	—	—	—	—

Table A.2—Base terms^a

Reference ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements. ^b)	Display name	Definition	Type	Format	Unit of measure	Enumerator ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements.)	K	O	C	CC
MSMT_LEADHVCHNL_STATUS	Lead high-voltage channel status	The indication whether to check the high-voltage lead.	Enum	N/A	—	ENUM_CHANNEL_STATUS	—	—	—	—
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 time between the LV and RV pacing pulses (positive values indicate LV is first).	Numeric	F4.0	ms	—	—	—	—	—
SET_CRT_PACED_CHAMBERS	Ventricular chambers paced during CRT pacing.	The ventricular chambers paced during CRT pacing.	Enum	N/A	—	ENUM_CRT_PACED_CHAMBERS	—	—	—	—
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	100	—	—	—	—	—	—
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	—	—	—	—	—
SET_LEADCHNL_[CHAMBER] _SENSING_POLARITY	Lead channel setting sensing polarity	The indication of unipolar or bipolar configuration for sensing.	Enum	N/A	—	ENUM_POLARITY	—	—	—	—
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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _SENSING_ANODE_ELECTRODE _[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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _SENSING_CATHODE_LOCATION _[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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _SENSING_CATHODE_ELECTRODE _[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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _SENSING_ADAPTATION_MODE _PACING	Lead channel setting sensing adaptation mode	Specifies whether the sensitivity is fixed or adapting.	Enum	N/A	—	ENUM_SENSING_ADAPTATION_MODE	—	—	—	—
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	—	—	—	—	—
SET_LEADCHNL_[CHAMBER] _PACING_PULSEWIDTH	Lead channel setting pacing pulse width	The pacing output pulse width.	Numeric	F3.2	ms	—	—	—	—	—
SET_LEADCHNL_[CHAMBER] _PACING_POLARITY	Lead channel setting pacing polarity	The indication of unipolar or bipolar configuration for pacing.	Enum	N/A	—	ENUM_POLARITY	—	—	—	—

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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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _PACING_ANODE_ELECTRODE [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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _PACING_CATHODE_LOCATION [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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _PACING_CATHODE_ELECTRODE [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	—	—	—	CC1
SET_LEADCHNL_[CHAMBER] _PACING_CAPTURE_MODE	Lead channel setting pacing capture mode	The method the device uses for managing pacing capture.	Enum	N/A	—	ENUM_PACING _CAPTURE_MODE	—	—	—	—
SET_LEADHVCHNL	Lead high-voltage channel setting	The group of high-voltage settings.	GROUP	—	—	—	—	—	0.1	—
SET_LEADHVCHNL_SHOCK VECTOR	Lead high-voltage channel setting shock vector	The group of high-voltage shock vector settings.	GROUP	—	—	—	—	—	0.1	—
SET_LEADHVCHNL_SHOCK VECTOR_ANODE_LOCATION [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	—	—	—	CC1
SET_LEADHVCHNL_SHOCK VECTOR_ANODE_ELECTRODE [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	—	—	—	CC1
SET_LEADHVCHNL_SHOCK VECTOR_CATHODE_LOCATION [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	—	—	—	CC1
SET_LEADHVCHNL_SHOCK VECTOR_CATHODE_ELECTRODE [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	—	—	—	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	—	—	—	—
SET_BRADY_VENDOR_MODE	Brady setting mode (vendor specific)	The brady pacing mode as defined by vendor-specific codes.	String	20	—	—	—	—	—	—
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}/min	—	—	—	—	—
SET_BRADY_HYSTRATE	Brady setting hysteresis rate	The lower rate for the hysteresis feature.	Numeric	F3.0	{beats}/min	—	—	—	—	—
SET_BRADY_NIGHT_RATE	Brady setting night rate	The lower rate for the night rate feature.	Numeric	F3.0	{beats}/min	—	—	—	—	—
SET_BRADY_SENSOR_TYPE	Brady setting sensor type	The type of sensor applied for rate adaptive pacing.	String	20	—	—	—	—	—	—

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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}/min	—	—	—	—	—
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}/min	—	—	—	—	—
SET_BRADY_SAV_DELAY [HIGHLOW]	Brady setting SAV delay	The interval from an intrinsic (sensed) P wave to a paced ventricular event.	Numeric	F4.0	ms	—	—	—	—	—
SET_BRADY_PAV_DELAY [HIGHLOW]	Brady setting PAV delay	The interval from a paced atrial event to a paced ventricular event.	Numeric	F4.0	ms	—	—	—	—	—
SET_BRADY_AT_MODE_SWITCH_MODE	Brady setting AT mode switch mode	The atrial tachycardia mode switch mode.	Enum	N/A	—	ENUM_BRADY_MODE	—	—	—	—
SET_BRADY_AT_MODE_SWITCH_RATE	Brady setting AT mode switch rate	The atrial tachycardia mode switch rate.	Numeric	F3.0	{beats}/min	—	—	—	—	—
SET_TACHYTHERAPY	Tachy therapy settings	The group of high-level tachy therapy settings.	GROUP	—	—	—	—	—	0.1	—
SET_TACHYTHERAPY_VSTAT	Tachy therapy setting ventricular status	The high level programmed status for ventricular tachy therapies.	Enum	N/A	—	ENUM_THERAPY_STATUS	—	—	—	—
SET_TACHYTHERAPY_ASTAT	Tachy therapy setting atrial status	The high-level programmed status for atrial tachy therapies.	Enum	N/A	—	ENUM_THERAPY_STATUS	—	—	—	—
SET_ZONE	Zone settings	The group of zone settings.	GROUP	—	—	—	—	—	0..N	—
SET_ZONE_TYPE	Zone setting type category	The general type of the zone for tachy therapy detection.	Enum	N/A	—	ENUM_ZONE_TYPE	Y	RE	—	—
SET_ZONE_VENDOR_TYPE	Zone setting vendor type category	The vendor-specific type of the zone for tachy therapy detection.	Enum	N/A	—	ENUM_ZONE_VENDOR_TYPE	Y	RE	—	—
SET_ZONE_STATUS	Zone setting status	The status of the zone, whether it is active or not.	Enum	N/A	—	ENUM_ZONE_STATUS	—	—	—	—
SET_ZONE_DETECTION_INTERVAL	Zone setting detection interval	The upper interval limit of the zone for tachy therapy detection.	Numeric	F4.0	ms	—	—	—	—	—
SET_ZONE_DETECTION_BEATS_NUMERATOR	Zone setting detection beats numerator	The numerator portion of the tachy detection ratio.	Numeric	F3.0	{beats}	—	—	—	—	CC2
SET_ZONE_DETECTION_BEATS_DENOMINATOR	Zone setting detection beats denominator	The denominator portion of the tachy detection ratio.	Numeric	F3.0	{beats}	—	—	—	—	CC2
SET_ZONE_DETECTION_DETAILS	Zone setting detection details	A text describing arrhythmia detection details.	String	50	—	—	—	—	—	—
SET_ZONE_TYPE_ATP [1..10]	Zone setting ATP type	The type of antitachycardia pacing (ATP) sequences programmed per ATP type.	Enum	N/A	—	ENUM_ATP_TYPE	—	—	—	CC3
SET_ZONE_NUM_ATP_SEQS [1..10]	Zone setting number of ATP sequences	The number of ATP pulse sequences programmed per ATP type.	Numeric	F3.0	{seq}	—	—	—	—	CC3
SET_ZONE_SHOCK_ENERGY [1..10]	Zone setting shock energy	The shock energy delivered at a particular sequence of a zone therapy.	Numeric	F4.1	J	—	—	—	—	CC4
SET_ZONE_NUM_SHOCKS [1..10]	Zone Setting Number of Shocks	The maximum number of shocks set to be delivered at the given shock energy.	Numeric	F3.0	{shocks}	—	—	—	—	CC4
STAT	Statistics	The group of statistics.	GROUP	—	—	—	—	—	0..1	—

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Reference ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements. ^b)	Display name	Definition	Type	Format	Unit of measure	Enumerator ID Prepend MDC_IDC_ (NOTE—Spaces are only included for readability improvements.)	K	O	C	CC
STAT_DTM_[STRTEND]	Statistic date time	The date and time period for the aggregated statistics.	Date/Time	N/A	—	—	—	RE	—	—
STAT_HEART_RATE	Statistic heart rate	The group of heart rate statistics.	GROUP	—	—	—	—	—	0.1	—
STAT_HEART_RATE_DTM _[STRTEND]	Statistic heart rate date time	The date and time period for the heart rate statistics.	Date/Time	N/A	—	—	—	RE	—	CC5
STAT_HEART_RATE_ATRIAL _[MMM]	Statistic atrial heart rate	The mean atrial heart rate over the specified time period.	Numeric	F3.0	{beats}/min	—	—	—	—	—
STAT_HEART_RATE _VENTRICULAR_[MMM]	Statistic ventricular heart rate	The mean ventricular heart rate over the specified time period.	Numeric	F3.0	{beats}/min	—	—	—	—	—
STAT_BRADY	Brady statistics	The group of brady statistics.	GROUP	—	—	—	—	—	0.1	—
STAT_BRADY_DTM_[STRTEND]	Brady statistic date time	The date time period of the brady statistics.	Date/Time	N/A	—	—	—	RE	—	CC5
STAT_BRADY_RA_PERCENT _PACED	Brady statistic RA percent paced	The percentage of pacing events in the right atrial chamber over the specified time period.	Numeric	F3.1	%	—	—	—	—	—
STAT_BRADY_RV_PERCENT _PACED	Brady statistic RV percent paced	The percentage of pacing events in the right ventricular chamber over the specified time period.	Numeric	F3.1	%	—	—	—	—	—
STAT_BRADY_AP_VP_PERCENT	Brady statistic AP VP percent	The percentage of atrial pace-ventricular pace sequences in relationship to all AV sequences over the specified time period.	Numeric	F3.1	%	—	—	—	—	—
STAT_BRADY_AS_VP_PERCENT	Brady statistic AS VP percent	The percentage of atrial sense-ventricular pace sequences in relationship to all AV sequences over the specified time period.	Numeric	F3.1	%	—	—	—	—	—
STAT_BRADY_AP_VS_PERCENT	Brady statistic AP VS percent	The percentage of atrial pace-ventricular sense sequences in relationship to all AV sequences over the specified time period.	Numeric	F3.1	%	—	—	—	—	—
STAT_BRADY_AS_VS_PERCENT	Brady statistic AS VS percent	The percentage of atrial sense-ventricular sense sequences in relationship to all AV sequences over the specified time period.	Numeric	F3.1	%	—	—	—	—	—
STAT_AT	Atrial tachy statistics	The group of atrial tachyarrhythmia statistics.	GROUP	—	—	—	—	—	0.1	—
STAT_AT_DTM_[STRTEND]	Atrial tachy statistic date time	The date and time period for the AT statistics.	Date/Time	N/A	—	—	—	RE	—	CC5
STAT_AT_MODE_SW_MAX _DURATION	Atrial tachy statistic maximum mode switch duration	The maximum contiguous time the device is in AT mode switch over the specified time period.	Numeric	F8.0	s	—	—	—	—	—
STAT_AT_BURDEN_PERCENT	Atrial tachy statistic AT/AF burden percent	The percent of time in AT AF per day over the specified time period.	Numeric	F3.0	%	—	—	—	—	—
STAT_AT_MODE_SW_PERCENT _TIME	Atrial tachy statistic percent time in mode switch	The percentage of time the device is in AT mode switch over the specified time period.	Numeric	F3.0	%	—	—	—	—	—
STAT_AT_MODE_SW_PERCENT _TIME_PER_DAY	Atrial tachy statistic percent time in mode switch per day	The percentage of time per day the device is in AT mode switch over the specified time period.	Numeric	F3.0	%	—	—	—	—	—
STAT_AT_MODE_SW_COUNT	Atrial tachy statistic number of mode switches	The number of mode switches over the specified time period.	Numeric	F8.0	{switches}	—	—	—	—	—
STAT_AT_MODE_SW_COUNT _PER_DAY	Atrial tachy statistic number of mode switches per day	The average number of mode switches per day over the specified time period.	Numeric	F8.0	{switches}	—	—	—	—	—