



EULYNX Initiative



Europe's Rail Joint Undertaking

Interface specification SDI-IO

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ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-IO.1	Head	1 Introduction							
Eu.SDI-IO.5	Head	1.1 Release information							
Eu.SDI-IO.7	Info	[Eu.Doc.82] Interface specification SDI-IO CENELEC Phase: 5 Version: 4.0 (0.A) Approval date: 15.06.2023							
Eu.SDI-IO.6	Info	Version history							
Eu.SDI-IO.133	Info	version number: 3.0 (0.A) date: 16.05.2022 author: Jorge Block review: CCB changes: -							
Eu.SDI-IO.322	Info	version number: 3.1 (0.A) date: 08.06.2023 author: SDI task force review: changes: EUIO-373, EUIO-374, EUIO-377, EUIO-389							
Eu.SDI-IO.336	Info	version number: 4.0 (0.A) date: 27.06.2023 author: SDI task force review: TACS Mirror Group changes: EUIO-392, EUIO-395, EUIO-398							
Eu.SDI-IO.3	Head	1.2 Impressum							
Eu.SDI-IO.4	Info	Publisher: Europe's Rail Joint Undertaking https://rail-research.europa.eu/ EULYNX Initiative A full list of the EULYNX Partners can be found on www.eulynx.eu/index.php/members							
Eu.SDI-IO.2	Info	Responsible for this document: EU-Rail System Pillar Trackside Assets Control and Supervision domain							
Eu.SDI-IO.9	Info	Copyright EULYNX Partners All information included or disclosed in this document is licensed under the European Union Public License EUPL, Version 1.2 or later.							
Eu.SDI-IO.10	Head	1.3 Purpose							
Eu.SDI-IO.11	Info	This document specifies the diagnostic messages (data point IDs and values) as parts of the telegram contents of the standardised diagnosis interface for a communication between the Subsystem - Maintenance and Data Management and Subsystem – Generic IO (SDI-IO).							
Eu.SDI-IO.93	Info	This document contains the Subsystem - Generic IO specific diagnostic messages. The specifications defined in this document shall be complemented by the generic specification defined in Interface specification SDI Generic [Eu.Doc.94].							
Eu.SDI-IO.95	Info	Some items, referring to "interface-related" functionality of the communication partners, have been added to this specification as information, providing an overview only. In any case these are subject to appropriate systems (national) specification.							
Eu.SDI-IO.13	Info	This document is intended for the following users: <ul style="list-style-type: none"> • safety authorities • infrastructure managers • safety assessors • signalling system suppliers • validators 							
Eu.SDI-IO.326	Info	This document is applicable for both the EU-Rail System Pillar target architecture and the EULYNX architecture. The document is delivered as a single specification fitting both the System Pillar documentation sets and the EULYNX documentation sets. EU-Rail System Pillar is the technical authority for this document.							
Eu.SDI-IO.14	Head	1.4 Applicable standards and regulations							
Eu.SDI-IO.96	Info	The applicable standards and regulations used in EULYNX are listed in the EULYNX Reference Document List [Eu.Doc.12].							
Eu.SDI-IO.15	Info	The references listed in the EULYNX Reference Document List [Eu.Doc.12] shall be considered where they are indicated as being applicable to SDI in the "Applies to" column of the EULYNX Reference Document List [Eu.Doc.12].							
Eu.SDI-IO.16	Head	1.5 Applicable documents							
Eu.SDI-IO.17	Info	The current versions of documents used as input or related to this document are listed in the EULYNX Documentation Plan [Eu.Doc.11]. The relationships between the documents are displayed in the Appendix A1 Documentation plan and structure [Eu.Doc.11_A1].							
Eu.SDI-IO.18	Head	1.6 Appendices							

ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-IO.19	Info	- intentionally left blank -							
Eu.SDI-IO.20	Head	1.7 Terms and abbreviations							
Eu.SDI-IO.21	Info	The terms and abbreviations are listed in the EULYNX Glossary [Eu.Doc.9].							
Eu.SDI-IO.22	Head	1.8 Variability management							
Eu.SDI-IO.23	Info	This document describes harmonised requirements. Variability management is not applicable.							
Eu.SDI-IO.24	Head	1.9 Definition of object types							
Eu.SDI-IO.25	Info	The following definition for object types is applied in this document:							
Eu.SDI-IO.26	Info	<ul style="list-style-type: none"> "Req" - This denotes a mandatory requirement. 							
Eu.SDI-IO.27	Info	<ul style="list-style-type: none"> "Info" - This denotes additional information to help understand the specification. These objects do not specify any additional requirements. 							
Eu.SDI-IO.28	Info	<ul style="list-style-type: none"> "Head" - This denotes chapter headings. 							
Eu.SDI-IO.30	Head	2 Telegram SDI							
Eu.SDI-IO.129	Req	All references to Eu.Doc.94 refer to Interface specification SDI Generic version 4.0 (0.A).							Basic IO
Eu.SDI-IO.31	Info	This chapter defines the diagnostic messages - specifically the data points and values applied in the SDI-IO telegrams. The generic data points are defined in Eu.Doc.94.							Basic IO
Eu.SDI-IO.130	Info	The defined diagnostic messages are mandatory only when the physical interfaces related to the specific diagnostic message are available on the Subsystem – Generic IO.							Basic IO
Eu.SDI-IO.327	Head	2.1 Definition of columns							
Eu.SDI-IO.328	Info	Model Type: Column that marks whether an entry is a model class (Class), a diagnostic data point (Attribute), an enumeration header (ValueType (Enumeration)) or an enumeration value (Enumeration Literal).							Basic IO
Eu.SDI-IO.329	Info	Data Type: Column that indicates the data type for the diagnostic data points. Enumeration values are defined in the section 'Enumeration'.							Basic IO
Eu.SDI-IO.330	Info	Event/Timepoint: Column that indicates the trigger events to send a diagnostic data point.							Basic IO
Eu.SDI-IO.331	Info	Attribute Type: Column that indicates the type of diagnostic information contained in the data point. raw data: uninterpreted data that is measured. diagnosis: an attribute with discrete values (enumeration or boolean) that interprets the status of a system. There must be a table that directly links diagnostic enumeration values to statusTechnical values of that system. configuration: data that is not measured but often set by the manufacturer or operator; it describes characteristics of the system.							Basic IO
Eu.SDI-IO.332	Info	Optionality : Column that indicates whether a diagnostic data point is mandatory inside the model class (1), or optional (0..1). The diagnostic data of optional attributes may be required by national specifications. If an equipment or subsystem has the capability to collect and report the related diagnostic data, it must be reported in this data point. Note: In future phases of the System Pillar, national specifications will be replaced by harmonised specifications.							Basic IO
Eu.SDI-IO.34	Head	2.2 Telegrams SDI-IO							
Eu.SDI-IO.237	Req	IoController	The specific structure of the system from the point of view of the specifications is specified in the class diagram inserted in this chapter. The structure of the generic part is described in the chapter "generic requirements".	Class					Basic IO
Eu.SDI-IO.254	Req	LogicalChannel		Class					Basic IO
Eu.SDI-IO.255	Req	index	See Eu.Doc.45, Eu.IO.7609 and Eu.IO.7910	Attribute	index : String	on system init on Sw or Cfg change	configuration	1	Basic IO
Eu.SDI-IO.256	Req	operationalIdentifierAdjacentSystem	Operational identifier of the connected subsystem (see Eu.SAS.1784).	Attribute	operationalIdentifierAdjacentSystem : Byte	on system init on Sw or Cfg change	configuration	1	Basic IO
Eu.SDI-IO.257	Req	statusTechnical	Indicates the generic technical status of the logical channel. Note: Enumeration values defined in Interface specification SDI Generic [Eu.Doc.94]	Attribute	statusTechnical : StatusTechnical	on mdm connect on change	diagnosis	1	Basic IO
Eu.SDI-IO.258	Req	statusTechnicalManufacturerSpecificMessage	Must be used by the supplier to describe the reasons for a StatusTechnical != OK, that cannot be explained by existing datapoints. This Information MUST be provided from the supplier, if there is not already a defined attribute that explains a statusTechnical other than Ok. Allows to extend "StatusTechnical" for future uses from IMs & Suppliers if the StatusTechnical = not OK-. This should provide flexibility for future uses. Multiple states can be indicated at the same time if multiple reasons are present. Note: Enumeration values defined in Interface specification SDI Generic [Eu.Doc.94]	Attribute	statusTechnicalManufacturerSpecificMessage : MultiStateDiscreteTypeSupplier [0..1]	on mdm connect on change	diagnosis	0..1	Basic IO

ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-IO.252	Req	LogicalInputChannel		Class					Basic IO
Eu.SDI-IO.260	Req	logicalInputValue	reports the current state of the Input Channels	Attribute	logicalInputValue : LogicalInputValue	on mdm connect on change	diagnosis	1	Basic IO
Eu.SDI-IO.261	Req	LogicalInputChannelSinglePort		Class					Basic IO
Eu.SDI-IO.265	Req	LogicalInputChannelTwoPorts		Class					Basic IO
Eu.SDI-IO.269	Req	isValenceFailure	True: Depending on the set valence type, a valency error results when the corresponding timer has expired. Example: Physical ports (reference and validation) have the same value, although antivalence is set.	Attribute	isValenceFailure : Boolean	on mdm connect on change	diagnosis	1	Basic IO
Eu.SDI-IO.270	Req	valenceType	Valence type of a dual channel	Attribute	valenceType : ValenceType	on system init on Sw or Cfg change	configuration	1	Basic IO
Eu.SDI-IO.249	Req	LogicalOutputChannel		Class					Basic IO
Eu.SDI-IO.272	Req	dutyRatioFixedConfuration	Con_t_Flash_Duty_Cycle as defined in Eu.IO.7683	Attribute	dutyRatioFixedConfuration : DutyRatioFixedConfuration	on system init on Sw or Cfg change	configuration	1	Option flashing
Eu.SDI-IO.273	Req	flashingPeriodFixedConfiguration	Con_t_Flash_Period as defined in Eu.IO.7684	Attribute	flashingPeriodFixedConfuration : FlashingPeriodFixedConfuration	on system init on Sw or Cfg change	configuration	1	Option flashing
Eu.SDI-IO.274	Req	logicalOutputValueCommanded	received commands to set a given state at the Output Channels	Attribute	logicalOutputValueCommanded : LogicalOutputValue	on mdm connect on change	raw data	1	Basic IO
Eu.SDI-IO.275	Req	outputStatus	reports the status related to disturbance of the Output Channels	Attribute	outputStatus : OutputStatus	on mdm connect on change	diagnosis	1	Basic IO
Eu.SDI-IO.276	Req	LogicalOutputChannelSinglePort		Class					Basic IO
Eu.SDI-IO.280	Req	LogicalOutputChannelTwoPorts		Class					Basic IO
Eu.SDI-IO.284	Req	isValenceFailure	True: Depending on the set valence type, a valency error results when the corresponding timer has expired. Example: Physical ports (reference and validation) have the same value, although antivalence is set	Attribute	isValenceFailure : Boolean	on mdm connect on change	diagnosis	1	Basic IO
Eu.SDI-IO.285	Req	valenceType	Valence type of a dual channel	Attribute	valenceType : ValenceType	on system init on Sw or Cfg change	configuration	1	Basic IO
Eu.SDI-IO.286	Req	PortInputType		Class					Basic IO
Eu.SDI-IO.287	Req	portType	Indicates whether the physical channels acts as reference or validation channel	Attribute	portType : ChannelTwoPortsType	on system init on Sw or Cfg change	configuration	1	Basic IO
Eu.SDI-IO.288	Req	PortOutputType		Class					Basic IO
Eu.SDI-IO.289	Req	portType	Indicates whether the physical channels acts as reference or validation channel	Attribute	portType : ChannelTwoPortsType	on system init on Sw or Cfg change	configuration	1	Basic IO
Eu.SDI-IO.290	Head	2.3 Enumeration		Package					
Eu.SDI-IO.291	Req	ChannelTwoPortsType	Enumeration	ValueType (Enumeration)					Basic IO
Eu.SDI-IO.292	Req	ReferenceChannel	0	Enumeration Literal					Basic IO
Eu.SDI-IO.293	Req	ValidationChannel	1	Enumeration Literal					Basic IO
Eu.SDI-IO.294	Req	DutyRatioFixedConfiguration	Enumeration	ValueType (Enumeration)					Option flashing
Eu.SDI-IO.323	Req	Unknown	0	Enumeration Literal					Option flashing
Eu.SDI-IO.295	Req	25%on	1	Enumeration Literal					Option flashing
Eu.SDI-IO.296	Req	50%on	2	Enumeration Literal					Option flashing
Eu.SDI-IO.297	Req	75%on	3	Enumeration Literal					Option flashing
Eu.SDI-IO.298	Req	Other	4	Enumeration Literal					Option flashing
Eu.SDI-IO.334	Req	notConfigured	5	Enumeration Literal					Option flashing
Eu.SDI-IO.299	Req	FlashingPeriodFixedConfiguration	Enumeration	ValueType (Enumeration)					Option flashing
Eu.SDI-IO.324	Req	Unknown	0	Enumeration Literal					Option flashing

ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-IO.302	Req	2000ms	1	Enumeration Literal					Option flashing
Eu.SDI-IO.301	Req	1333ms	2	Enumeration Literal					Option flashing
Eu.SDI-IO.300	Req	1000ms	3	Enumeration Literal					Option flashing
Eu.SDI-IO.303	Req	800ms	4	Enumeration Literal					Option flashing
Eu.SDI-IO.304	Req	Other	5	Enumeration Literal					Option flashing
Eu.SDI-IO.335	Req	notConfigured	6	Enumeration Literal					Option flashing
Eu.SDI-IO.305	Req	LogicalInputValue	Enumeration	ValueType (Enumeration)					Basic IO
Eu.SDI-IO.309	Req	Unknown	0	Enumeration Literal					Basic IO
Eu.SDI-IO.307	Req	SwitchedOff	1	Enumeration Literal					Basic IO
Eu.SDI-IO.308	Req	SwitchedOn	2	Enumeration Literal					Basic IO
Eu.SDI-IO.306	Req	Disturbed	3	Enumeration Literal					Basic IO
Eu.SDI-IO.310	Req	LogicalOutputValue	Enumeration	ValueType (Enumeration)					Basic IO
Eu.SDI-IO.314	Req	Unkown	0	Enumeration Literal					Basic IO
Eu.SDI-IO.312	Req	SwitchedOff	1	Enumeration Literal					Basic IO
Eu.SDI-IO.313	Req	SwitchedOn	2	Enumeration Literal					Basic IO
Eu.SDI-IO.311	Req	Flashing	3	Enumeration Literal					Option flashing
Eu.SDI-IO.315	Req	OutputStatus	Enumeration	ValueType (Enumeration)					Basic IO
Eu.SDI-IO.318	Req	Unknown	0	Enumeration Literal					Basic IO
Eu.SDI-IO.316	Req	NotPhysicallyDisturbed	1	Enumeration Literal					Basic IO
Eu.SDI-IO.317	Req	PhysicallyDisturbed	2	Enumeration Literal					Basic IO
Eu.SDI-IO.319	Req	ValenceType	Enumeration	ValueType (Enumeration)					Basic IO
Eu.SDI-IO.325	Req	Unknown	0	Enumeration Literal					Basic IO
Eu.SDI-IO.320	Req	Antivalence	1	Enumeration Literal					Basic IO
Eu.SDI-IO.321	Req	Equivalence	2	Enumeration Literal					Basic IO
Eu.SDI-IO.333	Head	2.4 IO class diagram		Package					
Eu.SDI-IO.236	Info	IO class diagram See Figure 1 on page 5.		Class Diagram					Basic IO

Figure 1: From object 236 on page 4.

