EULYNX

EULYNX Initiative

Europe's Rail Joint Undertaking

Interface specification SDI-LS

Contents

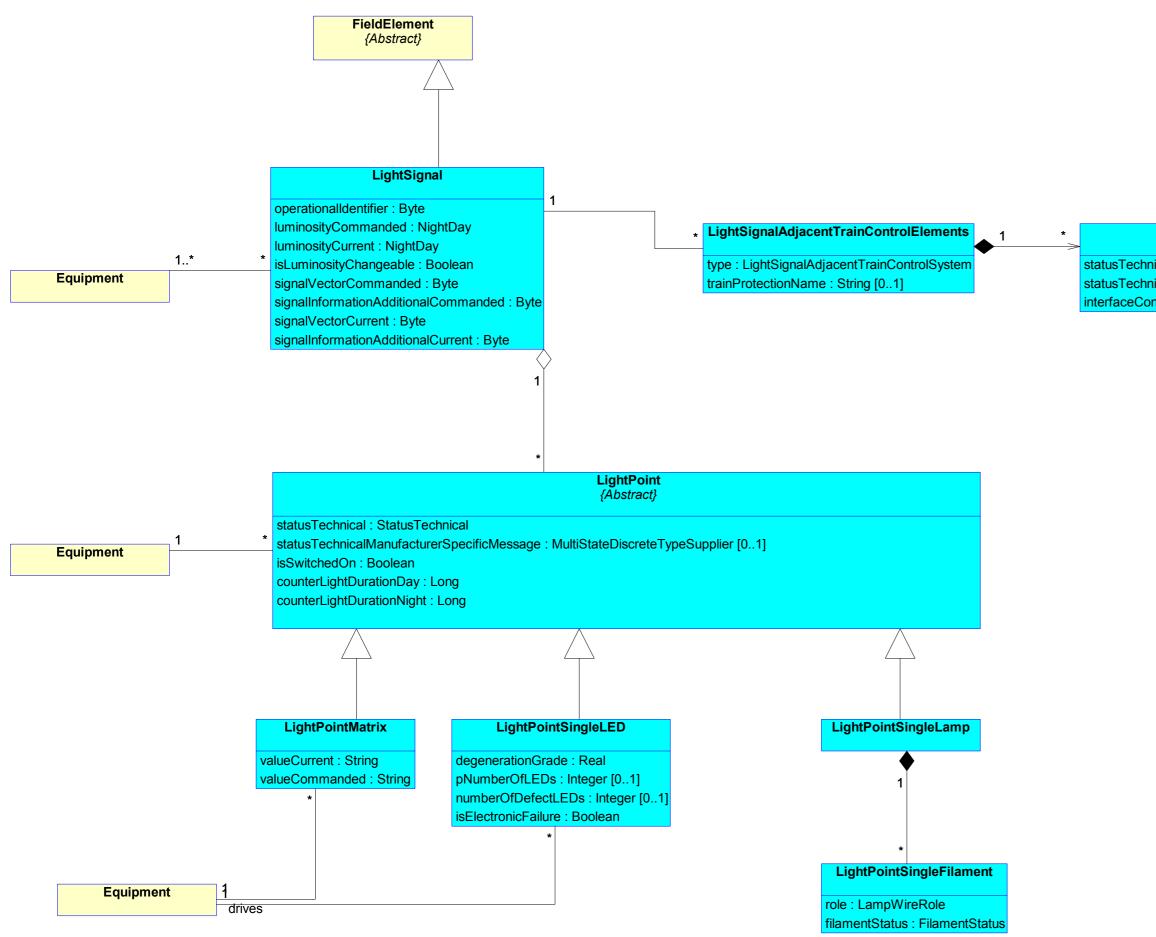| ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-LS.1	Head	**1 Introduction**							
Eu.SDI-LS.2	Head	**1.1 Release information**							
Eu.SDI-LS.3	Info	[Eu.Doc.78] Interface specification SDI-LS CENELEC Phase: 5 Version: 4.0 (0.A) Approval date: 15.06.2023							
Eu.SDI-LS.4	Info	**Version history**							
Eu.SDI-LS.225	Info	version number: 3.0 (0.A) date: 16.05.2022 author: Filip Giering review: CCB changes: EULS-384, EULS-386							
Eu.SDI-LS.226	Info	version number: 3.1 (0.A) date: 08.06.2023 author: SDI task force review: changes: EULS-398, EULS-400, EULS-401, EULS-406, EULS-418							
Eu.SDI-LS.292	Info	version number: 4.0 (0.A) date: 27.06.2023 author: SDI task force review: TACS Mirror Group changes: EULS-422, EULS-424, EULS-426							
Eu.SDI-LS.7	Head	**1.2 Impressum**							
Eu.SDI-LS.8	Info	Publishers: **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-LS.9	Info	Responsible for this document: EU-Rail System Pillar Trackside Assets Control and Supervision domain							
Eu.SDI-LS.10	Info	Copyright EULYNX Partners All information included or disclosed in this document is licensed under the European Union Public Licence EUPL, Version 1.2 or later.							
Eu.SDI-LS.11	Head	**1.3 Purpose**							
Eu.SDI-LS.12	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 – Light Signal (SDI-LS).							
Eu.SDI-LS.31	Info	This document contains the Subsystem - Light Signal 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-LS.33	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-LS.14	Info	This document is intended for the following users: • safety authorities • infrastructure managers • safety assessors • signalling system suppliers • validators							
Eu.SDI-LS.227	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-LS.15	Head	**1.4 Applicable standards and regulations**							
Eu.SDI-LS.16	Info	The applicable standards and regulations used in EULYNX are listed in the EULYNX Reference Document List [Eu.Doc.12].							
Eu.SDI-LS.34	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-LS.17	Head	**1.5 Applicable documents**							
Eu.SDI-LS.18	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-LS.19	Head	**1.6 Appendices**							

ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-LS.20	Info	*- intentionally left blank -*							
Eu.SDI-LS.21	Head	**1.7 Terms and abbreviations**							
Eu.SDI-LS.22	Info	The terms and abbreviations are listed in the EULYNX Glossary [Eu.Doc.9].							
Eu.SDI-LS.23	Head	**1.8 Variability management**							
Eu.SDI-LS.24	Info	This document describes harmonised requirements. Variability management is not applicable.							
Eu.SDI-LS.25	Head	**1.9 Definition of object types**							
Eu.SDI-LS.26	Info	The following definition for object types is applied in this document:							
Eu.SDI-LS.27	Info	• "Req" - This denotes a mandatory requirement.							
Eu.SDI-LS.28	Info	• "Info" - This denotes additional information to help understand the specification. These objects do not specify any additional requirements.							
Eu.SDI-LS.29	Info	• "Head" - This denotes chapter headings.							
Eu.SDI-LS.37	Head	**2 Telegram SDI**							Basic LS
Eu.SDI-LS.224	Req	All references to Eu.Doc.94 refer to Interface specification SDI Generic version 4.0 (0.A).							Basic LS
Eu.SDI-LS.38	Info	This chapter defines the diagnostic messages - specifically the data points and values applied in the SDI-LS telegrams. The generic data points are defined in Eu.Doc.94.							Basic LS
Eu.SDI-LS.223	Info	The defined diagnostic messages are mandatory only when the physical interfaces related to the specific diagnostic message are available on the Subsystem – Light Signal.							Basic LS
Eu.SDI-LS.230	Head	**2.1 Definition of columns**							Basic LS
Eu.SDI-LS.231	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 LS
Eu.SDI-LS.232	Info	**Data Type:** Column that indicates the data type for the diagnostic data points. Enumeration values are defined in the section 'Enumeration'.							Basic LS
Eu.SDI-LS.233	Info	**Event/Timepoint:** Column that indicates the trigger events to send a diagnostic data point.							Basic LS
Eu.SDI-LS.234	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 LS
Eu.SDI-LS.235	Info	**Optionality :** Column that indicates whether a diagnostic data point in 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 LS
Eu.SDI-LS.39	Head	**2.2 Telegrams SDI-LS**							Basic LS
Eu.SDI-LS.236	Req	LightPoint		Class					Basic LS
Eu.SDI-LS.237	Req	counterLightDurationDay	Total illumination time of the light point in Day mode since the first installation in seconds	Attribute	counterLightDurationDay : Long	on mdm connect || on change >= |3600s|	raw data	1	Basic LS
Eu.SDI-LS.238	Req	counterLightDurationNight	Total illumination time of the light point in Night mode since the first installation in seconds	Attribute	counterLightDurationNight : Long	on mdm connect || on change >= |3600s|	raw data	1	Basic LS
Eu.SDI-LS.239	Req	isSwitchedOn	True: The light Point is switched on	Attribute	isSwitchedOn : Boolean	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.240	Req	statusTechnical	Indicates the generic technical status of the light Point. Note: Enumeration values defined in Interface specification SDI Generic [Eu.Doc.94]	Attribute	statusTechnical : StatusTechnical	on mdm connect || on change	diagnosis	1	Basic LS
Eu.SDI-LS.241	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 LS
Eu.SDI-LS.242	Req	LightPointMatrix		Class					Basic LS

ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-LS.243	Req	valueCommanded	The commanded value, e.g. a letter for the direction or the speed. If no value is commanded, "none" must be transmitted.	Attribute	valueCommanded : String	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.244	Req	valueCurrent	The displayed value, e.g. a letter for the direction or the speed. If no value is displayed, "none" must be transmitted.	Attribute	valueCurrent : String	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.245	Req	LightPointSingleFilament		Class					Basic LS
Eu.SDI-LS.246	Req	filamentStatus	Status of the lamp filament	Attribute	filamentStatus : FilamentStatus	on mdm connect || on change	diagnosis	1	Basic LS
Eu.SDI-LS.247	Req	role	Describes whether a filament is main or auxiliary	Attribute	role : LampWireRole	on system init||on Sw or Cfg change	configuration	1	Basic LS
Eu.SDI-LS.248	Req	LightPointSingleLamp		Class					Basic LS
Eu.SDI-LS.249	Req	LightPointSingleLED		Class					Basic LS
Eu.SDI-LS.250	Req	degenerationGrade	The degree of degeneration of the light point in %. 100% means: all LEDs failed; 0% means: no LED failed.	Attribute	degenerationGrade : Real	on mdm connect || on change |1%|	diagnosis	1	Basic LS
Eu.SDI-LS.251	Req	isElectronicFailure	True: There is a failure in the electronics of the light point.	Attribute	isElectronicFailure : Boolean	on mdm connect || on change	diagnosis	1	Basic LS
Eu.SDI-LS.252	Req	numberOfDefectLEDs	Number of defective LEDs in the light point	Attribute	numberOfDefectLEDs : Integer [0..1]	on mdm connect || on change	raw data	0..1	Basic LS
Eu.SDI-LS.253	Req	pNumberOfLEDs	Total number of LEDs in the light point	Attribute	pNumberOfLEDs : Integer [0..1]	on system init||on Sw or Cfg change	configuration	0..1	Basic LS
Eu.SDI-LS.254	Req	LightSignal		Class					Basic LS
Eu.SDI-LS.255	Req	isLuminosityChangeable	True: luminosity is changeable	Attribute	isLuminosityChangeable : Boolean	on system init || on Sw or Cfg change	configuration	1	Basic LS
Eu.SDI-LS.256	Req	luminosityCommanded	reports the command received from the interlocking to set a given luminosity	Attribute	luminosityCommanded : NightDay	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.257	Req	luminosityCurrent	reports the currently indicated luminosity	Attribute	luminosityCurrent : NightDay	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.258	Req	operationalIdentifier	Operational identifier of the connected subsystem (see Eu.SAS.1784).	Attribute	operationalIdentifier : Byte	on system init || on Sw or Cfg change	configuration	1	Basic LS
Eu.SDI-LS.259	Req	signalInformationAdditionalCommanded	Reports the additional signal information currently commanded at the light signal by the interlocking. Corresponds to Bytes 49 until 60 of the telegram Cd_Indicate_Signal_Aspect	Attribute	signalInformationAdditionalCommanded : Byte	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.260	Req	signalInformationAdditionalCurrent	Reports the additional signal information currently indicated by the light signal. Corresponds to Bytes 49 until 60 of the telegram Msg_Indicated_Signal_Aspect	Attribute	signalInformationAdditionalCurrent : Byte	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.261	Req	signalVectorCommanded	Reports the signal aspect currently commanded at the light signal by the interlocking. Corresponds to bytes 43 until 48 of the telegram Cd_Indicate_Signal_Aspect	Attribute	signalVectorCommanded : Byte	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.262	Req	signalVectorCurrent	Reports the signal aspect currently indicated by the light signal. Corresponds to Bytes 43 until 48 of the telegram Msg_Indicated_Signal_Aspect	Attribute	signalVectorCurrent : Byte	on mdm connect || on change	raw data	1	Basic LS
Eu.SDI-LS.264	Req	LightSignalAdjacentOutputChannel		Class					Option LS4 Option LS5
Eu.SDI-LS.265	Req	interfaceConnectionStatus	Mandatory in case the adjacent train control element is type 1 Eurobalise.	Attribute	interfaceConnectionStatus : InterfaceConnectionStatus	on mdm connect || on change	diagnosis	1	Option LS4
Eu.SDI-LS.266	Req	statusTechnical	Indicates the generic technical status of the output channel to the adjacent LS system. Note: Enumeration values defined in in Interface specification SDI Generic [Eu.Doc.94]	Attribute	statusTechnical : StatusTechnical	on mdm connect || on change	diagnosis	1	Option LS4 Option LS5
Eu.SDI-LS.267	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. Note: Enumeration values defined in in Interface specification SDI Generic [Eu.Doc.94] Multiple states can be indicated at the same time if multiple reasons are present.	Attribute	statusTechnicalManufacturerSpecificMessage : MultiStateDiscreteTypeSupplier [0..1]	on mdm connect || on change	diagnosis	0..1	Option LS4 Option LS5
Eu.SDI-LS.268	Req	LightSignalAdjacentTrainControlElements		Class					Option LS4 Option LS5

ID	Type	Requirement	Meaning	Model Type	Data Type	Event/Timepoint	Attribute Type	Optionality	Func. Pkg.
Eu.SDI-LS.269	Req	trainProtectionName	Name of the Legacy Train Protection System	Attribute	trainProtectionName : String [0..1]	on system init||on Sw or Cfg change	configuration	0..1	Option LS4 Option LS5
Eu.SDI-LS.270	Req	type	Describes whether the adjacent LS system is a Eurobalise of a Legacy Train Protection System	Attribute	type : LightSignalAdjacentTrainContr olSystem	on system init||on Sw or Cfg change	configuration	1	Option LS4 Option LS5
Eu.SDI-LS.271	Head	**2.2.1 Enumeration**		Package					
Eu.SDI-LS.272	Req	FilamentStatus	Enumeration	ValueType (Enumeration)					Basic LS
Eu.SDI-LS.275	Req	Unknown	0	Enumeration Literal					Basic LS
Eu.SDI-LS.274	Req	Ok	1	Enumeration Literal					Basic LS
Eu.SDI-LS.273	Req	Failure	2	Enumeration Literal					Basic LS
Eu.SDI-LS.276	Req	InterfaceConnectionStatus	Enumeration	ValueType (Enumeration)					Option LS4
Eu.SDI-LS.280	Req	Unknown	0	Enumeration Literal					Option LS4
Eu.SDI-LS.277	Req	Ok	1	Enumeration Literal					Option LS4
Eu.SDI-LS.279	Req	ShortCircuit	2	Enumeration Literal					Option LS4
Eu.SDI-LS.278	Req	OpenCircuit	3	Enumeration Literal					Option LS4
Eu.SDI-LS.281	Req	LampWireRole	Enumeration	ValueType (Enumeration)					Basic LS
Eu.SDI-LS.283	Req	MainFilament	1	Enumeration Literal					Basic LS
Eu.SDI-LS.282	Req	AuxiliaryFilament	2	Enumeration Literal					Basic LS
Eu.SDI-LS.284	Req	LightSignalAdjacentTrainControlSystem	Enumeration	ValueType (Enumeration)					Option LS4 Option LS5
Eu.SDI-LS.285	Req	Eurobalise	1	Enumeration Literal					Option LS4
Eu.SDI-LS.286	Req	LegacyTrainProtectionSystem	2	Enumeration Literal					Option LS5
Eu.SDI-LS.287	Req	NightDay	Enumeration	ValueType (Enumeration)					Basic LS
Eu.SDI-LS.290	Req	Unknown	0	Enumeration Literal					Basic LS
Eu.SDI-LS.288	Req	Day	1	Enumeration Literal					Basic LS
Eu.SDI-LS.289	Req	Night	2	Enumeration Literal					Basic LS
Eu.SDI-LS.291	Head	**2.2.2 LightSignal class diagram**		Package					
Eu.SDI-LS.263	Info	LightSignal class diagram See Figure 1 on page 5.		Class Diagram					Basic LS