

Data Communication for HVAC Applications

Field Level Objects mapping to EIB

CEN

European Committee for Standardisation
Comité Européen de Normalisation
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1 Introduction

This document describes the mapping from EIB objects to FLN-Objects with an interface. The interface holds all additional data for EIB-Objects and converts data types from EIB-Objects to display them as FLN-Objects.

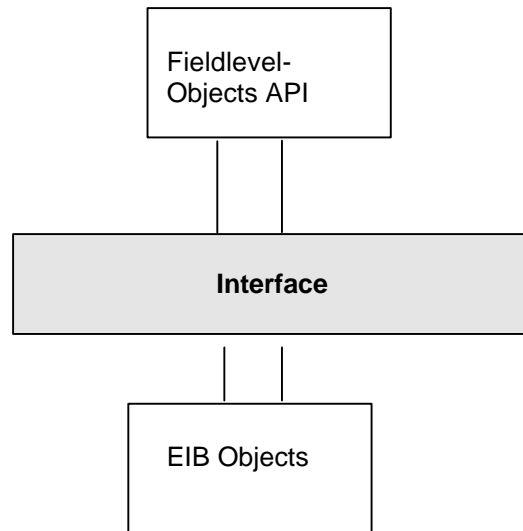


Figure 1: Relationship FLN-Objects and EIB objects

2 References

- EIBA-Handbook for Development Issue 3.0 (Draft)
- European Prestandard : Data Communication for HVAC Application Field Level Objects

3 Object structure

3.1 Object Identifier

The main distinction in the object structure is that each FLN-Object has an explicit property for the Object_ID_Number and EIB-Objects don't have a explicit object-ID. An EIB-Object has an object id only for addressing. The EIB object-ID consist of the physical device address and the index of the object in the device. Each object identifier in the EIB is unique for the EIB-Network.

Physical Address High	Physical Address Low	Object-Index
8-Bit	8-Bit	8-Bit

Figure 1: Unique EIB Object Identifier

The interface must map the EIB Object Identifier to the FLN Object property Object_ID_Number.

3.2 Property-Types

Each property of an EIB-Object has an explicit type information. Therefore special properties with type information like the Value_Presentation property in the FLN Objects are not needed.

EIB Property Data Type	FLN-Object Data Type
PT_CONTROL	Unsigned8
PT_CHAR	Signed8
PT_UNSIGNED_CHAR	Unsigned8
PT_INT	Signed16
PT_UNSIGNED_INT	Unsigned16
PT_EIB_FLOAT	Float16
PT_DATE	Converted to Date
PT_TIME	Converted to Time
PT_LONG	Signed32
PT_UNSIGNED_LONG	Unsigned32
PT_FLOAT	Float32
PT_DOUBLE	Float64
PT_CHAR_BLOCK	Octet String[10]
PT_POLL_GROUP_SETTINGS	Octet String[3]
PT_SHORT_CHAR_BLOCK	Char String[5]
PT_GENERIC_01	Octet String[1]
PT_GENERIC_02	Octet String[2]
PT_GENERIC_03	Octet String[3]
PT_GENERIC_04	Octet String[4]
PT_GENERIC_05	Octet String[5]
PT_GENERIC_06	Octet String[6]
PT_GENERIC_07	Octet String[7]
PT_GENERIC_08	Octet String[8]
PT_GENERIC_09	Octet String[9]
PT_GENERIC_10	Octet String[10]

Figure 2: Data-Types

4 Objects and Properties

4.1 Relationship between EIB Objects and FLN Object Types

The EIB Object type can mapped directly to FLN Object types with the following table.

EIB Object types	EIB-Type (decimal)	FLN Object types	FLN Type(decimal)
Device Object	0	Device Object	8
Adresstable Object	1		
Associationtable Object	2		
Applicationprogramm Object	3	Program Object	16
Interface Program	4	Program Object	16
EIB-Object-Associationtable-Object	5		
Router Filtertable	6		
Pollingmaster	10		
File	11	File	10
Analogue-Input	100	Analogue-Input	0
Analogue-Output	101	Analogue-Output	1
Analogue-Value	102	Analogue-Value	2
Binary-Input	103	Binary-Input	3
Binary-Output	104	Binary-Output	4
Binary-Value	105	Binary-Value	5
Counter	106	Counter Input / Value	127/128
Loop	107	Loop	12
Multistate-Input	108	Multistate-Input	13
Multistate-Output	109	Multistate-Output	14
		Multistate Value	126
		notification-class	15
		schedule	

Figure 3: Relations between EIB Object types and FLN Object types

4.2 Relationship between EIB Object and FLN Object Properties

EIB-Property-IDs	EIB-Property-Id (Object-ID)	FLN Object-Properties
Reserved	0	
PID_OBJECT_TYPE	1	Object_Type
PID_OBJECT_NAME	2	Object_Name
PID_SEMAPHOR	3	
PID_GROUP_OBJECT_REFERENCE	4	
PID_LOAD_STATE_CONTROL	5	
PID_RUN_STATE_CONTROL	6	
PID_TABLE_REFERENCE	7	
PID_SERVICE_CONTROL	8	
PID_FIRMWARE_REVISION	9	Firmware_Version
PID_SERVICES_SUPPORTED	10	
PID_SERIAL_NUMBER	11	
PID_MANUFACTURER_ID	12	
PID_PROGRAM_VERSION	13	
PID_DEVICE_CONTROL	14	
PID_ORDER_INFO	15	
PID_PEI_TYPE	16	
PID_PORT_CONFIGURATION	17	
PID_POLL_GROUP_SETTINGS	18	
PID_MANUFACTURE_DATA	19	
PID_ENABLE	20	
PID_DESCRIPTION	21	Description
PID_FILE	22	
PID_POLLING_STATE	51 (10)	
PID_SLAVE_ADDR	52 (10)	
PID_POLL_CYCLE	53 (10)	
PID_FILE_SIZE	51 (11)	
PID_MOD_DATE	52 (11)	
PID_MOD_TIME	53 (11)	
PID_FILE_FLAGS	54(11)	
...		

EIB-Property-IDs	EIB-Property-Id (Object-ID)	FLN Object-Properties
PID_PRESENT_VAL	101 (100-199)	Present_Value
PID_STATUS	102(100-199)	Status
PID_UNITS	103(100-199)	Units
PID_PRIORITY_ARRAY	104(100-199)	Priority
PID_DEFAULT	105(100-199)	Default
PID_PRIORITY_VALUE	106(100-199)	Priority
PID_COMM_VALUE	107(100-199)	Commanded Value
PID_EVT_ALARM_CTR	108(100-199)	COV Enabled Warning/Alarm Enabled
PID_HIGH_ALARM_LIMIT	109(100-199)	High_Alarm_Limit
PID_HIGH_WARNING_LIMIT	110(100-199)	High_Warning_Limit
PID_LOW_ALARM_LIMIT	111(100-199)	Low_Alarm_Limit
PID_LOW_WARNING_LIMIT	112(100-199)	Low_Warning_Limit
PID_POLARITY	113(100-199)	-
PID_TOTAL_RUN_TIME	114(100-199)	Total_Runtime
PID_PRESENT_VALUE_REFERENCE	115(100-199)	
PID_UPDATE_INT	116(100-199)	
PID_CONTROLLED_VARIABLE_VALUE	117(100-199)	
PID_CONTROLLED_VARIABLE_REFERENCE	118(100-199)	
PID_CONTROLLED_VARIABLE_UNITS	119(100-199)	
PID_SETPOINT	120(100-199)	
PID_SETPOINT_REFERENCE	121(100-199)	
PID_PRIORITY_FOR_WRITING	122(100-199)	
PID_P_CONST	123(100-199)	
PID_I_CONST	124(100-199)	
PID_D_CONST	125(100-199)	
PID_STATE_COUNT	126(100-199)	
PID_INT_CNT	127(100-199)	
PID_INT_LIMIT	128(100-199)	
PID_INT_PERIOD	129(100-199)	
PID_COV_LIMIT	130(100-199)	

Figure 4: EIB Properties

There are 3 different type of EIB properties global properties, object type specific property ids and application specific property ids. The object type specific properties must be mapped in connection with the object type and the application specific properties must be mapped in connection with the application and object type.

5 Conversion of EIB-Objects to FLN-Objects

There are different cases to convert the properties of an EIB-Object to the properties of a FLN-Object.

- only property mapping
- property mapping and type conversion
- property mapping and value mapping by a table
- complex conversion by the interface program

Mandatory properties from the FLN-Object which are not existing in the EIB are set by the Interface program.

5.1 Analogue Input/Output/Value Object

EIB-Property ID	Type Conversion	Optional / Mandatory/ Writeable/ Engineerable EIB FLN	FLN Object Property ID	If not existing in EIB
PID_OBJECT_TYPE		M	Object_Type	
PID_OBJECT_NAME		O M	Object_Name	Set by Interface
PID_DESCRIPTION		O	Description	
PID_PRESENT_VAL	Type	M / W	Present Value Value_Presentation	
PID_STATUS		O M	Status	Set by Interface
PID_UNITS	Table	O M	Units	Set by Interface
PID_PRIORITY_ARRAY	Interface	O	Priority	
PID_DEFAULT	Type	O E	Default	
PID_PRIORITY_VALUE		O	Priority	
PID_COMM_VALUE	Type	O	Commanded_Value	
PID_EVT_ALARM_CTR	Table	O	Warning_Enable Alarm_Enable	
PID_HIGH_ALARM_LIMIT	Type	O	High_Alarm_Limit	
PID_HIGH_WARNING_LIMIT	Type	O	High_Warning_Limit	
PID_LOW_ALARM_LIMIT	Type	O	Low_Alarm_Limit	
PID_LOW_WARNING_LIMIT	Type	O	Low_Warning_Limit	

Figure 5: Conversion of the Analogue Object Type to FLN Object

5.2 Binary Input/Output/Value

EIB-Property ID	Type Conversion	Optional / Mandatory/ Writeable/ Engineerable EIB FLN	FLN Object Property ID	If not existing in EIB
PID_OBJECT_TYPE		M	Object_Type	
PID_OBJECT_NAME		O M	Object_Name	set by interface
PID_DESCRIPTION		O	Description	
PID_PRESENT_VAL	Type	M / W	Present_Value	
PID_STATUS	Interface	O M	Status	set by interface
PID_PRIORITY_ARRAY	Interface	O	Priority	
PID_DEFAULT	Type	O E	Default	
PID_COMM_VALUE		O	Commanded_Value	
PID_EVT_ALARM_CTR	Table	O	COV_Enable Alarm_Enable	
PID_POLARITY	Interface	O E	Polarity	
PID_ELAPSED_ACTIVE_TIME	Type Interface	O	Total_Runtime	
		- M	Statetext	set by interface

Figure 6: Conversion of Binary Device Object Type to FLN Object

Statetext

5.3 Counter Object

EIB-Property ID	Type Conversion	Optional / Mandatory/ Writeable EIB FLN Object	FLN Object Property ID	If not existing in EIB
PID_OBJECT_TYPE		M	Object_Type	
PID_OBJECT_NAME		O M	Object_Name	set by interface
PID_DESCRIPTION		O	Description	
PID_PRESENT_VAL	Type	M / W	Present Value Value_Presentation	
PID_STATUS	Interface	O M	Status	set by interface
PID_UNITS	Table	O M	Units	set by interface
PID_PRIORITY_VALUE	Interface	O	Priority_Value	
PID_EVT_ALARM_CTR	Table	O	COV_Enable Alarm_Enable	
PID_INT_CNT		O	Interval_Counter	
PID_INT_LIMIT		O	Interval_Limit	
PID_INT_PERIOD		O -	-	
PID_COV_LIMIT		O	COV_Increment	

Figure 7: Conversion of the Counter Object Type to FLN Object

5.4 Device Object

EIB-Property ID	Type Conversion	Optional / Mandatory/ Writeable EIB FLN Object	FLN Object Property ID	If not existing in EIB
PID_OBJECT_TYPE		M	Object_Type	
PID_OBJECT_NAME		O M	Object_Name	set by interface
PID_DEVICE_CONTROL		O		
PID_SERVICE_CONTROL		O		
PID_FIRMWARE_REVISION		M	Firmware_Revision	
PID_SERIAL_NUMBER		O		
PID_MANUFACTURER_ID	Table	M	Vendor_Name	set by interface
PID_ORDER_INFO		O		
PID_PEL_TYPE		O		
PID_POLL_GROUP_SETTINGS		O		
PID_PORTADDR		O		
PID_DESCRIPTION		O	Device_Type_Description	set by interface
	Interface	M	Device_Status	set by interface
	Interface	M	Common_Object_List	set by interface

Figure 8: Conversion of the Device Object Type to FLN Object

5.5 Multistate Object

EIB-Property ID	Type Conversion	Optional / Mandatory/ Writeable EIB FLN Object	FLN Object Property ID	If not existing in EIB
PID_OBJECT_TYPE		M	Object_Type	
PID_OBJECT_NAME		O M	Object_Name	set by interface
PID_DESCRIPTION		O	Description	
PID_PRESENT_VAL	Type	M / W	Present Value Value_Presentation	
PID_STATUS	Interface	O M	Status	set by interface
PID_PRIORITY	Interface	O	Priority_Array	
PID_DEFAULT	Type	O E	Default	
PID_PRIORITY_VALUE	Interface	O	Priority_Value	
PID_EVT_ALARM_CTR	Table	O	COV_Enable Alarm_Enable	
PID_COMM_VALUE		O	Commanded_Value	
PID_STATE_COUNT	Interface	O -		
PID_TOTAL_RUN_TIME	Type Interface	O	Elapsed Active Time Time Of Active Time Reset	
		- M	Statetext	set by interface

Figure 9: Conversion of the Multistate Object Type to FLN Object

5.6 Loop Object

EIB-Property ID	Type Conversion	Optional / Mandatory/ Writeable EIB FLN Object	FLN Object Property ID	If not existing in EIB
PID_OBJECT_TYPE		M	Object_Type	
PID_OBJECT_NAME		O M	Object_Name	set by Interface
PID_DESCRIPTION		O	Description	
PID_PRESENT_VAL (Y)	Type	M / W	Present Value Value_Presentation	
PID_STATUS		O M	Status	set by Interface
PID_PRIORITY_FOR_-WRITING		O		
PID_UNITS (Y)		O M	Output_Units(Y)	set by Interface
PID_POLARITY		O -	-	
PID_PRESENT_VAL_REFERENCE		O ..-	-	
PID_UPDATE_INTERVAL	Type	O E	Update_Interval	
PID_CONTROLLED_- VARIABLE_REFERENCE (X)		O ..-	-	
PID_CONTROLLED_- VARIABLE_VALUE (X)	Type	M	Controlled_Variable_Value Value_Presentation	
PID_CONTROLLED_- VARIABLE_UNITS	Interface	O M	X_W_Variable_Units	set by Interface
PID_SETPOINT_REFERENCE	Interface	O -	-	
PID_SETPOINT	Type	M	Setpoint Value_Presentation	
PID_EVT_ALARM-CTR	Table	O	COV_Enable Alarm_Enable	set by Interface
PID_P_CONST	Type	O E	Proportional Constant	
PID_I_CONST	Type	O E	Integral Constant	
PID_D_CONST	Type	O E	Derived Constant	

Figure 10: Conversion of the Loop Object Type to FLN Object

5.7 Alarm and COV Notification

On the EIB alarms and COV notifications are sent over group objects. There exists no EIB-Objects for alarm- and COV notifications. The implementation of notification objects is part of the interface program. The interface program has to add all mandatory parts to create a FLN-conform Alarm/COV-notification pdu. The distribution of alarms and COV notifications is done via the EIB group mechanism.