EnOcean Equipment Profiles (EEP)

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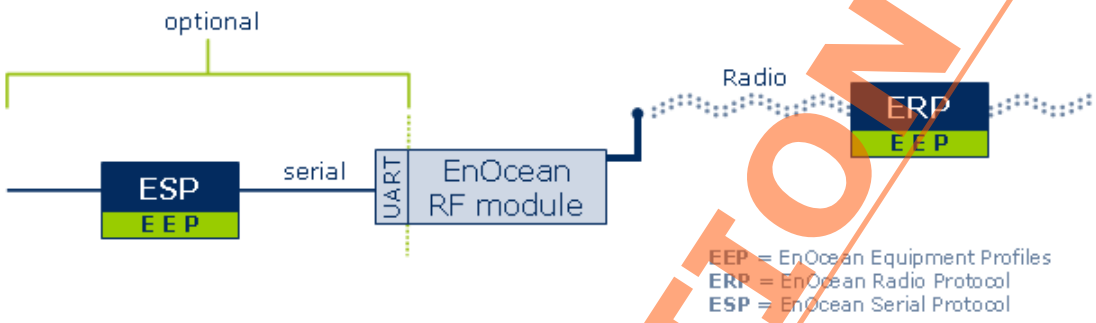
1) Introduction

1.1) Terms, Abbreviations

1BS	EnOcean 1 Byte Communication
4BS	EnOcean 4 Byte Communication
BAS	Building Automation System
Choice	Unique identification of EnOcean radio telegram types (RPS, 1BS, 4BS, ...); equivalent with RORG
Client	Bidirectional Smart Ack Device
Data	Payload of ERP telegrams or ESP packets
EEP	EnOcean Equipment Profiles
ERP	EnOcean Radio Protocol
ESP	EnOcean Serial Protocol
HTML	Hyper Text Markup Language; HTML can be displayed using a internet browser
MSC	Manufacturer Specific Communication
N/A	Not applicable
ORG	Organizational number for EnOcean radio telegram types (out-dated with EEP 2.1; used for ESP2 interface)
RORG	Radio ORG = organization number for EnOcean radio telegram types (new with EEP 2.1); equivalent with 'Choice'
RMCC	Remote Management Control Commands
RPC	Remote Procedure Calls
RPS	EnOcean telegram type for Repeated Switch Communication
Smart Ack	Smart Acknowledge EnOcean standard for energy-optimized bidirectional transmission
UART	Universal Asynchronous Receiver Transmitter
VLD	EnOcean Variable Length Data telegram
XML	Extensible Markup Language; designed to transport and store data
XSL	Extensible Stylesheet Language; XML based language to visualize XML (data)

1.2) General

The EnOcean radio protocol (ERP) is optimized to transmit information with utmost reliability using extremely little power while ensuring that the products of customers applying EnOcean technology are compatible with each other. Only the very shortest transmission period (< 1ms) for an EnOcean telegram allows the design of, for example, a battery-free radio switch, which can produce a full radio command with just approx. 50 µWs (50 µJ) of energy. At the same time, the reliability of the system increases, as the possibility of data collision is strongly reduced.
Every data bit in the radio telegram is essential. For each '0' or '1' state, content descriptions are definied, which must be followed by the sender and the receiver likewise. Depending on the telegram type and the function of the device the user data (payload) is defined in:
EEP (EnOcean Equipment Profiles)



The ERP specification defines the structure of the entire radio telegram. The user data embedded in this structure is defined by the EEP.

The objective of interoperability is easier to reach with as less profiles as required. Therefore, it is EnOcean Alliance's goal to configure each profile as universally as possible, to target a spectrum of devices in the building automation sector for all manufacturers.

It is of high interest to the EnOcean Alliance that Alliance members verify new devices or newly joined companies verify their products against the existing EEP Profiles and adopt these during testing. Every newly defined EEP would increase diversity and therefore decrease interoperability.

The technical characteristics of a device define three profile elements, which make up the organizational description of all profiles:

1. The ERP radio telegram type (RORG)
2. Basic functionality of the data content (FUNC)
3. Type of device in its individual characteristics (TYPE)

Therefore, every EEP profile has a number, reflecting these three components:

EEP 2.0:	ORG	FUNC	TYPE
EEP 2.5:	**RORG**	**FUNC**	**TYPE**
Range (hex):	00 ... FF	00 ... 3F	00 ... 7F
	8 bit	6 bit	7 bit

Every field is represented by a hexadecimal number, where the maximum value is limited by the available bits.

Before the definition of a new profile existing profiles should be checked first for suitability. A new profile is to be defined only if the existing profiles would not be adequate.

Once a new profile is to be developed it should be submitted to the TWG of the EnOcean Alliance. The information to

be provided is

- the XML-data, plus
- the profile as text in a pdf-file (the .pdf-data is to be generated from the XML-data)

The TWG will review and ratify the profile. Following the recommendation by the TWG the BoD will disapprove or approve the profile.

When defining a new profile rules, abbreviations and terms as per this document have to be applied.

To maintain the XML-data and the linked pdf-document in a proper way a document maintenance process is defined. For details refer to appendix 3.14 Data + document maintenance process.

1.3) What's new in EEP 2.6.7 ?

New VLD profiles:

- D2-34-00: Heating Actuator / 1 Output Channel
- D2-34-01: Heating Actuator / 2 Output Channels
- D2-34-02: Heating Actuator / 8 Output Channels

Modified VLD profile family D2-50-xx:

- Telegram 'Ventilation Control Message' Offset 41: valid range 0...127
- Telegram 'Ventilation Basic Status Message' Offset 40,47,54,61: valid range 0...127
- Telegram 'Ventilation Extended Status Message' Offset 16: valid range / scale modified
- Chapter TYPE 10, 11 -> reference TYPE 00

1.4) Telegram types (RORG)

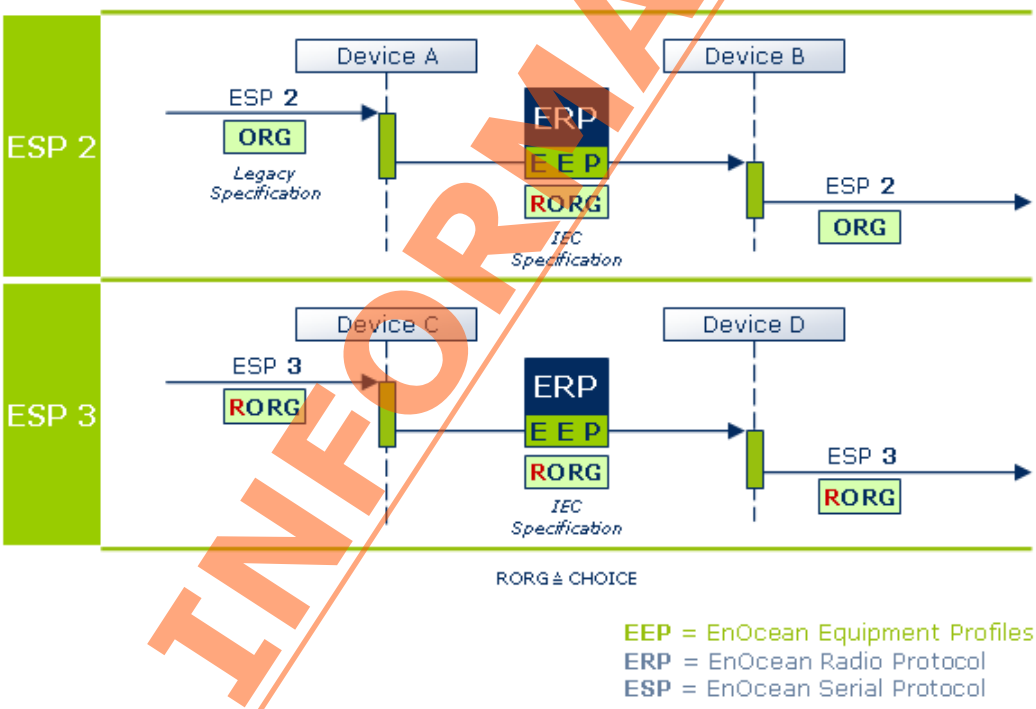
The various **R**adio-Telegram types are grouped **ORG**anizationally.

The specifications of ERP (EnOcean Radio Protocol) and of ESP (EnOcean Serial Protocol) group telegram types by 'CHOICE' number. 'RORG' at EEP 2.1(2.5) corresponds to 'CHOICE'.

The following RORG are used in EEP 2.5:

Telegram	RORG	ORG	
RPS	F6	05	Repeated Switch Communication
1BS	D5	06	1 Byte Communication
4BS	A5	07	4 Byte Communication
VLD	D2	=RORG	Variable Length Data
MSC	D1	=RORG	Manufacturer Specific Communication
ADT	A6	=RORG	Adressing Destination Telegram
SM_LRN_REQ	C6	=RORG	Smart Ack Learn Request
SM_LRN_ANS	C7	=RORG	Smart Ack Learn Answer
SM_REC	A7	=RORG	Smart Ack Reclaim
SYS_EX	C5	=RORG	Remote Management
SEC	30	=RORG	Secure telegram
SEC_ENCAPS	31	=RORG	Secure telegram with R-ORG encapsulation

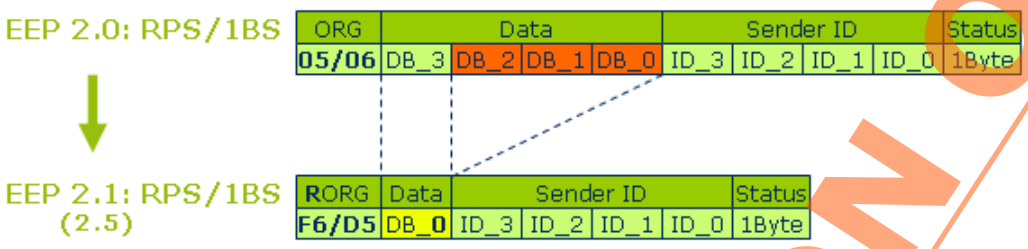
For compatibility reasons, the old ORG values on the serial ESP2 interfaces remain valid. However, on the air interface, each ESP2 telegram is transported with the appropriate RORG (= CHOICE).



1.5) EEP modifications at RPS and 1BS data telegram

Both telegram types carry a one byte payload (DB_0) on the wireless interface (ERP).

EEP 2.0 follows the specification of the serial interface / ESP2, which defines the payload to be carried in DB_3 (see succeeding figure). The trailing bytes, DB_2, DB_1 and DB_0 are marked as 'unused'.



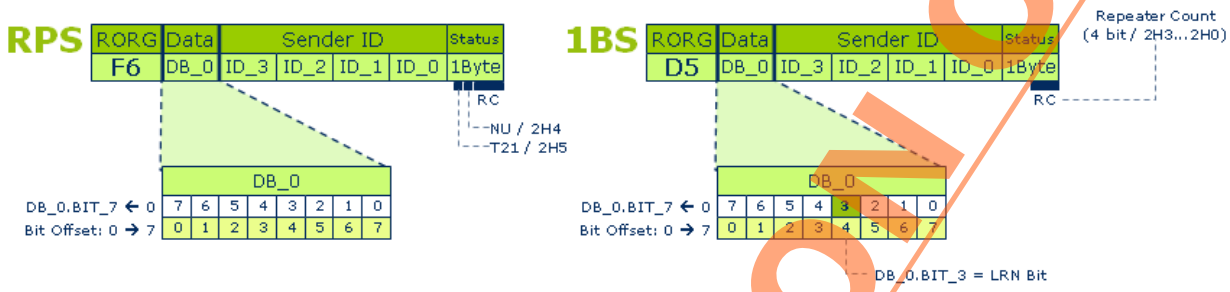
For orthogonal data structural reasons, this deviation will be avoided with EPP 2.1, 2.5 and future versions. The new ESP3 serial interface already respects this.

For reasons of compatibility of end devices, the ESP2 interface remains unaltered, i.e. the DB_0 byte (radio) will continue to be transferred as a DB_3 byte (serial) (including the 3 unused bytes).
The conversation has to happen on the application layer as the XML-data structure of EEP 2.1 / 2.5 only refers to the DB_0 byte.

As a consequence of this modification the LRN bit is now described in a row for the 1BS and 4BS telegram types as standardized with the DB_0.BIT_3 position.

1.6) Structure and addressing of the telegram types

1.6.1) RPS / 1BS

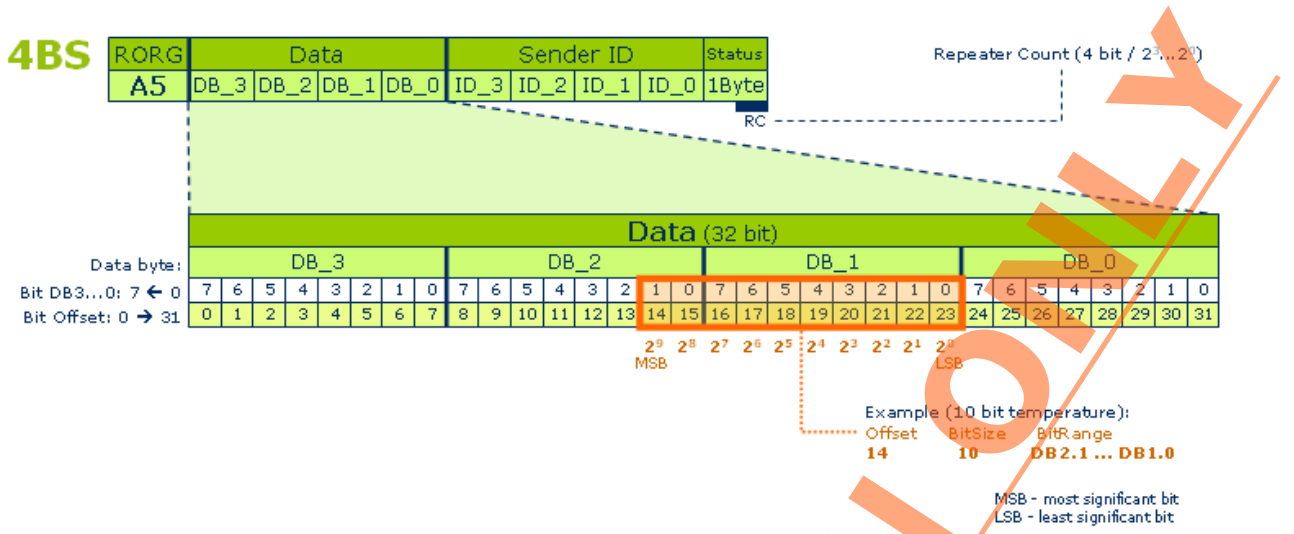


The RPS and the 1BS telegrams offer only 1 byte user data. These two telegrams differ in the respective learning operations (the 1BS has a LRN bit), and in the way the status byte is used.
Comment for RPS status bits:
T21 = 0 = PTM switch module of type 1 / synonymous for module PTM1xx
T21 = 1 = PTM switch module of type 2 / synonymous for module PTM2xx
NU = 1 = N-message (N = normal)
NU = 0 = U-message (U = unassigned)

1.6.2) 4BS

A 4BS telegram carries a payload of 4 bytes. The sequence of the 4 data bytes is historically reversed, so that DB_3 appears first and DB_0 last on the radio interface. The bits are addressed in the sequence of the data flow, however (offset). Hence, DB_3.BIT_7 has the offset position 0 and DB_0.BIT_3 (LRN bit) has the offset position 28. The actual content-bits in a byte are not affected by this, i.e., they are described from right (2H0) to left (2H7) in the ascending order.

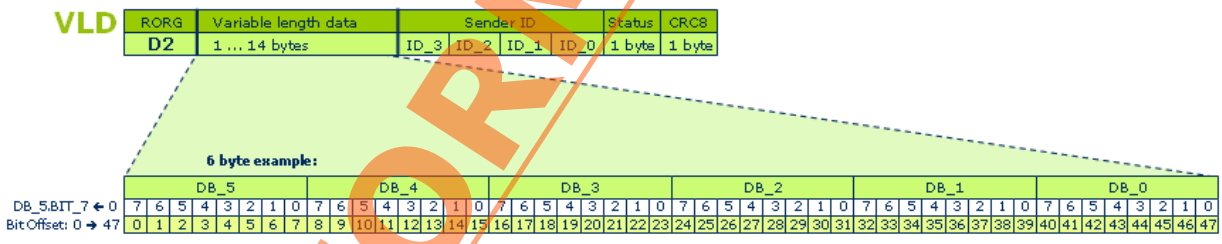
The example of a 10-bit temperature profile (see below) illustrates the binary valuation of the individual bits, so that a number range from 0 ... 1023 can be addressed.



1.6.3) VLD

VLD telegrams carry a variable payload between one and 14 bytes, depending on their design. The teach-in process applies the Smart Ack procedure (see appendices 3.4 and 3.5).

The example following displays a VLD telegram with 6 bytes user data. DB_5.BIT_7 is the first transmitted bit with offset 0.



1.7) Teach-in procedures

The 'Teach-in' defines the mutual communication between wireless devices in an 868 (315) MHz radio network.
The 'Teach-in' defines to which transmitter(s) a receiver needs to listen to.
For this purpose of a determined relationship between transmitter and receiver each transmitting device has a unique Sender-ID which is part of each radio telegram. The receiving device detects from the Sender-ID whether the device is known, i.e., was already learned, or unknown.
A telegram with unknown Sender-ID is disregarded.

The 'teach-in' process is different for each telegram type (RPS, 1BS, 4BS, Smart Ack), but the following points are valid for all telegrams:

- First, the receiver must be switched into learning mode. Now, the Sender-ID of an arriving telegram is interpreted as an authorized information source and will be stored at the receiver. The further steps of 'teach-in' are defined by the device type or the telegram type. Thus, normal data telegrams or special teach-in telegrams can be used. Frequently, a learn button triggers the teach-in process.
- The telegram of the respective transmitter should be triggered at least once (by pressing the desired switch

rocker or triggering a sensor).
- The bits of the payload (data bytes) can have multiple functions depending on the interpretation set by identification or status bits. Only in the 1BS and 4BS telegram the 'LRN BIT' DB_0.BIT_3 is reserved exclusively and must not be used elsewhere.

The following issues are relevant for a number of application but not mandatory for specification perspective:

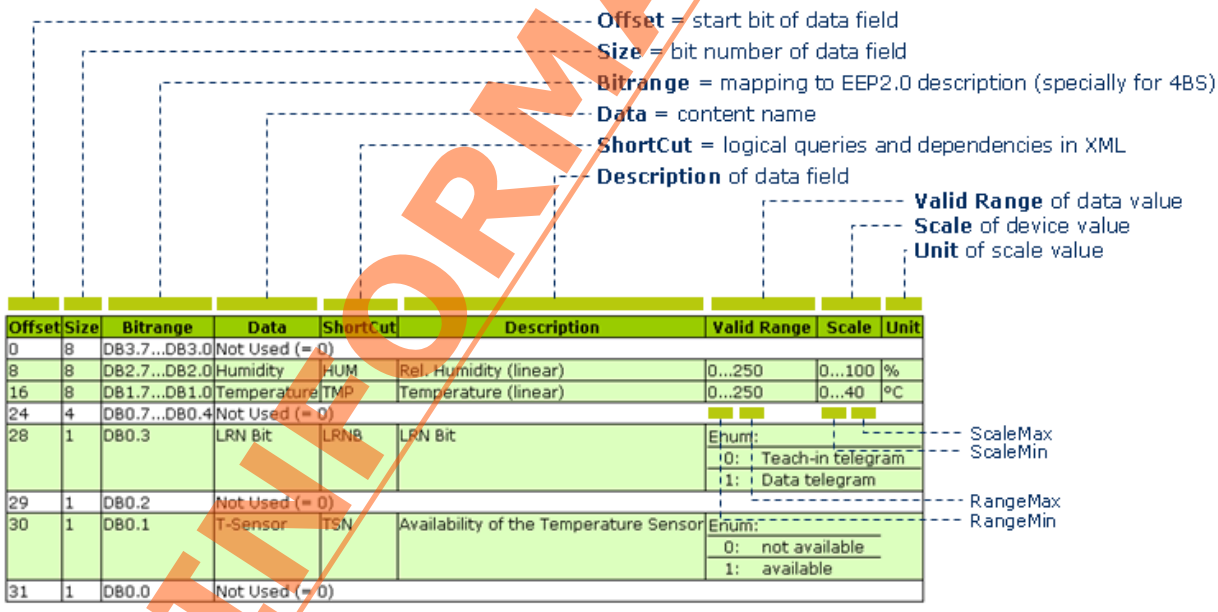
- To prevent unwanted devices from being learned the input sensitivity of the receiver is often restricted, and thus an IN-ROOM operation is created. Typically, the device to be learned is placed close by the receiver.
- Dolphin-based transmitters (e.g. TCM 300 or TCM 2x with Dolphin library) can also be switched into the learn-mode via a remote management command. This remote 'teach-in' mode can only be activated within the first 30 min after receiver power-up. To avoid inadvertent learning the transmitter telegrams have to be triggered 3 times within 2 seconds.

For further details on the 'Teach-in' processes refer to appendices 3.1 to 3.6.

1.8) Viewing XML-data

- The XML-file and all the associated files (CSS, DTD, XSL) and the 'graphics' folder must be stored in the same directory.
- The XML-file is best opened using an Internet browser, generating an HTML-view which displays the describing chapters, graphics and data tables.
- Mozilla Firefox V3.6 or upwards is recommended for optimum screen and print view.

The following example illustrates the HTML-view of the XML-data of a 4BS telegram (= payload of 32 bits).



Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	T-Sensor	TSN	Availability of the Temperature Sensor	Enum: 0: not available 1: available		
31	1	DB0.0	Not Used (= 0)					

Data ranges unused are displayed in the table as white rows.

The 'Bit range' column displays the starting-point and the end-point of the respective data.

The 'Valid range', 'Scale' and 'Unit' columns are displayed separately only for measurement values. However, these 3 columns are merged into one if the data comes from an enumeration (enum).

Assuming a linear conversion between the value to be measured and the 'valid range' of data the resolution can be calculated as follows:

Conversion: Valid Range ---> Scale

$$\text{Multiplier} = \frac{\text{Scale}_{MAX} - \text{Scale}_{MIN}}{\text{Range}_{MAX} - \text{Range}_{MIN}}$$

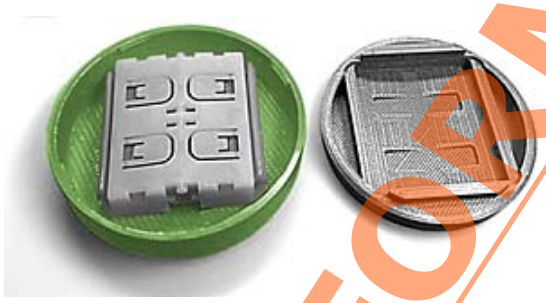
$$\text{Device value} = \text{Multiplier} * (\text{rawValue} - \text{Range}_{MIN}) + \text{Scale}_{MIN}$$

F6: RPS Telegram

Note for all F6-RPS EEP usage on ERP 2: ERP 2 (EnOcean Radio Protocol 2) is the radio protocol with FSK encoding. It is compatible on the application level with ERP 1. With ERP 2 all EPPs, Protocols (Security / Smart Acknowledge) can be used as it was before. Only difference are the RPS profiles. The ERP 2 (EnOcean Radio Protocol 2) – does not use the RPS telegrams as ERP 1 did. The biggest difference is the usage of the Status Field. The Status field in ERP 2 is defined as a repeater count field (also other position in the telegram). Other functionalities and fields T21 and NU are not present any more. Therefore a new encoding was developed. EEP describe an equipment – device - application. The meaning of the data did not change only the coding. The logic and semantic of the application is still the same. So it is defined that RPS profiles on ERP 2 have different coding of the actual telegram data, but the logic is same on ERP 1 and ERP 2. The new coding is published as new profiles. This is required to keep the same interfaces on the EEP processing (e.g. existing gateways / IP gateways - we do not want have additional information which radio protocol was used – ERP1/ERP2). The exact details are listed below. The profiles are defined in way that a seamless translation between ERP 1 and ERP 2 vice versa is possible without contextual information, what profile it is in particular.

F6-01: Switch Buttons

This profile is used to simple switch design which does not use any rockers. The whole actuation area for the switch is being moved. There are simple two statuses press & hold / released.



RORG	F6	**RPS Telegram**
FUNC	01	Switch Buttons
TYPE	01	Push Button

Submitter: EnOcean GmbH

Description
This profile represents a very simple push button which has no coding for rockers enabled. Its mechanical construction does not require any coding of rocker status and therefore is not used. It simply sends the energy bow status as push & hold / release. The databyte & status is kept compatible to the F6-02-01 profile, only the energy bow bit is used, status is adjusted to corresponding telegram (no button pressed).

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: N/A
Trigger event: button is pressed / released
Tx delay: -
Rx timeout: -

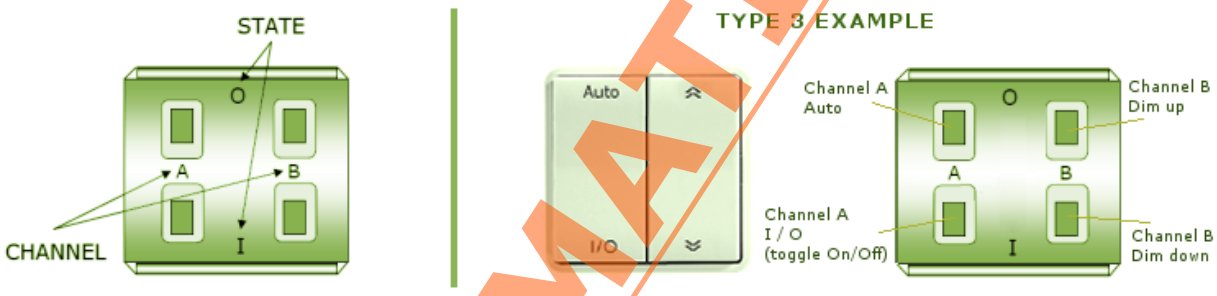
Teach-in
Teach-in method: RPS teach-in

Security
Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB0.7...DB0.5	Not Used (= 0)					
3	1	DB0.4	Push button	PB	Status of the push button	Enum: 0: Released 1: Pressed & Hold		
4	4	DB0.3...DB0.0	Not Used (= 0)					

F6-02: Rocker Switch, 2 Rocker

For clarification reasons the following picture shows a PTM200 transmitter module from EnOcean GmbH which transmits RPS telegrams and is one possibility to be used in applications that require an EEP F6-02-xx. Please note that PTM200 does not support transmission of teach-in telegrams.



The button naming used below is referring to CHANNEL and STATE of the PTM200. Thus "Button AI" means STATE „I" on CHANNEL „A".

There are two different message types, the N-message and the U-message, which need to be identified from the Status Field of an EnOcean RPS telegram. For that reason not only the data bytes are given for each EEP but the T21 and NU bits of the Status Field are listed as well.

RORG	F6	RPS Telegram
FUNC	02	Rocker Switch, 2 Rocker
TYPE	01	Light and Blind Control - Application Style 1

This EEP definition is based on the assumption that a RPS switch module (e.g. PTM200) is installed in a 0-STATE up position! Application Style 1 is widely used in EU but may be found in other markets as well.

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	1

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB0.7...DB0.5	Rocker 1st action	R1	....	Enum: 0: Button AI: "Switch light on" or "Dim light down" or "Move blind closed"		

						1: Button A0: "Switch light off" or "Dim light up" or "Move blind open" 2: Button BI: "Switch light on" or "Dim light down" or "Move blind closed" 3: Button B0: "Switch light off" or "Dim light up" or "Move blind open"
3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed
4	3	DB0.3...DB0.1	Rocker 2nd action	R2	....	Enum: 0: Button AI: "Switch light on" or "Dim light down" or "Move blind closed" 1: Button A0: "Switch light off" or "Dim light up" or "Move blind open" 2: Button BI: "Switch light on" or "Dim light down" or "Move blind closed" 3: Button B0: "Switch light off" or "Dim light up" or "Move blind open"
7	1	DB0.0	2nd Action	SA	....	Enum: 0: No 2nd action 1: 2nd action valid

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	0

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB0.7...DB0.5	Number of buttons pressed simultaneously (other bit combinations are not valid)	R1	....	Enum: 0: no button 3: 3 or 4 buttons		
3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed		
4	4	DB0.3...DB0.0	Not Used (= 0)					

RORG	F6	RPS Telegram
FUNC	02	Rocker Switch, 2 Rocker
TYPE	02	Light and Blind Control - Application Style 2

This EEP definition is based on the assumption that a RPS switch module (e.g. PTM200) is installed in an I-STATE up position! Application Style 2 is typically used in US and CAN but may be found in other markets as well.

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	1

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit

0	3	DB0.7...DB0.5	Rocker 1st action	R1	....	Enum: 0: Button AI: "Switch light on" or "Dim light up" or "Move blind open" 1: Button A0: "switch light off" or "Dim light down" or "Move blind closed" 2: Button BI: "Switch light on" or "Dim light up" or "Move blind open" 3: Button B0: "Switch light off" or "Dim light down" or "Move blind closed"
3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed
4	3	DB0.3...DB0.1	Rocker 2nd action	R2	....	Enum: 0: Button AI: "Switch light on" or "Dim light up" or "Move blind open" 1: Button A0: "switch light off" or "Dim light down" or "Move blind closed" 2: Button BI: "Switch light on" or "Dim light up" or "Move blind open" 3: Button B0: "Switch light off" or "Dim light down" or "Move blind closed"
7	1	DB0.0	2nd Action	SA	....	Enum: 0: No 2nd action 1: 2nd action valid

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	0

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB0.7...DB0.5	Number of buttons pressed simultaneously (other bit combinations are not valid)	R1	....	Enum: 0: no button 3: 3 or 4 buttons		
3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed		
4	4	DB0.3...DB0.0	Not Used (= 0)					

RORG	F6	**RPS Telegram**
FUNC	02	Rocker Switch, 2 Rocker
TYPE	03	Light Control - Application Style 1

Submitter: Servodan

Definition of Auto, I/O for Rocker switch, Dim control (PTM200)

Statusfield:

Offset	Size	Data	Value
2	1	T21	1

3	1	NU	1

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB0.7...DB0.0	Rocker action	RA	....	Enum: 0x30: Button A0: Set the controller in automatic mode 0x10: Button A1: Set the controller in manually mode and toggles between switch light on and switch light off 0x70: Button B0: Dim light up 0x50: Button B1: Dim light down		

RORG	F6	**RPS Telegram**
FUNC	02	Rocker Switch, 2 Rocker
TYPE	04	Light and blind control ERP2

Submitter: EnOcean GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	DB0.7	Energy Bow	EBO	State of the energy bow	Enum: 0: released 1: pressed		
1	1	DB0.6	Button coding	BC	Signalize button coding	Enum: 0: button		
2	2	DB0.5...DB0.4	Not Used (= 0)					
4	1	DB0.3	BI	RBI	State I of the rocker B	Enum: 0: not pressed 1: pressed		
5	1	DB0.2	B0	RB0	State 0 of the rocker B	Enum: 0: not pressed 1: pressed		
6	1	DB0.1	AI	RAI	State I of the rocker A	Enum: 0: not pressed 1: pressed		
7	1	DB0.0	A0	RA0	State 0 of the rocker A	Enum: 0: not pressed 1: pressed		

F6-03: Rocker Switch, 4 Rocker

RORG	F6	**RPS Telegram**
FUNC	03	Rocker Switch, 4 Rocker
TYPE	01	Light and Blind Control - Application Style 1

This EEP definition is based on the assumption that a RPS switch module is installed in a 0-STATE up position!
Application Style 1 is widely used in EU but may be found in other markets as well.

Statusfield:

Offset	Size	Data	Value
2	1	T21	0
3	1	NU	1

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB0.7...DB0.5	Rocker 1st action	R1	....	Enum: 0: Button AI: "Switch light on" or "Dim light down" or "Move blind closed" 1: Button A0: "Switch light off" or "Dim light up" or "Move blind open" 2: Button BI: "Switch light on" or "Dim light down" or "Move blind closed" 3: Button B0: "Switch light off" or "Dim light up" or "Move blind open" 4: Button CI: "Switch light on" or "Dim light down" or "Move blind closed" 5: Button C0: "Switch light off" or "Dim light up" or "Move blind open" 6: Button DI: "Switch light on" or "Dim light down" or "Move blind closed" 7: Button D0: "Switch light off" or "Dim light up" or "Move blind open"		
3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed		
4	3	DB0.3...DB0.1	Rocker 2nd action	R2	....	Enum: 0: Button AI: "Switch light on" or "Dim light down" or "Move blind closed" 1: Button A0: "Switch light off" or "Dim light up" or "Move blind open" 2: Button BI: "Switch light on" or "Dim light down" or "Move blind closed" 3: Button B0: "Switch light off" or "Dim light up" or "Move blind open" 4: Button CI: "Switch light on" or "Dim light down" or "Move blind closed" 5: Button C0: "Switch light off" or "Dim light up" or "Move blind open" 6: Button DI: "Switch light on" or "Dim light down" or "Move blind closed" 7: Button D0: "Switch light off" or "Dim light up" or "Move blind open"		
7	1	DB0.0	2nd Action	SA	....	Enum: 0: No 2nd action 1: 2nd action valid		

Statusfield:

Offset	Size	Data	Value
2	1	T21	0
3	1	NU	0

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit

0	3	DB0.7...DB0.5	Number of buttons pressed simultaneously	R1	....	Enum: 0: no Button pressed 1: 2 buttons pressed 2: 3 buttons pressed 3: 4 buttons pressed 4: 5 buttons pressed 5: 6 buttons pressed 6: 7 buttons pressed 7: 8 buttons pressed
3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed
4	4	DB0.3...DB0.0	Not Used (= 0)			

RORG	F6	**RPS Telegram**
FUNC	03	Rocker Switch, 4 Rocker
TYPE	02	Light and Blind Control - Application Style 2

A This EEP definition is based on the assumption that a RPS switch module is installed in a I-STATE up position!
Application Style 2 is typically used in US and CAN but may be found in other markets as well.

Statusfield:

Offset	Size	Data	Value
2	1	T21	0
3	1	NU	1

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB0.7...DB0.5	Rocker 1st action	R1	....	Enum: 0: Button AI: “Switch light on” or "Dim light up” or "Move blind open” 1: Button A0: “Switch light off” or “Dim light down” or "Move blind closed” 2: Button BI: “Switch light on” or "Dim light up” or "Move blind open” 3: Button B0: “Switch light off” or “Dim light down” or "Move blind closed” 4: Button CI: “Switch light on” or "Dim light up” or "Move blind open” 5: Button C0: “Switch light off” or “Dim light down” or "Move blind closed” 6: Button DI: “Switch light on” or "Dim light up” or "Move blind open” 7: Button D0: “Switch light off” or “Dim light down” or "Move blind closed”		

3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed
4	3	DB0.3...DB0.1	Rocker 2nd action	R2	....	Enum: 0: Button AI: "Switch light on" or "Dim light up" or "Move blind open" 1: Button A0: "Switch light off" or "Dim light down" or "Move blind closed" 2: Button BI: "Switch light on" or "Dim light up" or "Move blind open" 3: Button B0: "Switch light off" or "Dim light down" or "Move blind closed" 4: Button CI: "Switch light on" or "Dim light up" or "Move blind open" 5: Button C0: "Switch light off" or "Dim light down" or "Move blind closed" 6: Button DI: "Switch light on" or "Dim light up" or "Move blind open" 7: Button D0: "Switch light off" or "Dim light down" or "Move blind closed"
7	1	DB0.0	2nd Action	SA	....	Enum: 0: No 2nd action 1: 2nd action valid

Statusfield:

Offset	Size	Data	Value
2	1	T21	0
3	1	NU	0

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB0.7...DB0.5	Number of buttons pressed simultaneously	R1	....	Enum: 0: no button pressed 1: 2 buttons pressed 2: 3 buttons pressed 3: 4 buttons pressed 4: 5 buttons pressed 5: 6 buttons pressed 6: 7 buttons pressed 7: 8 buttons pressed		
3	1	DB0.4	Energy Bow	EB	....	Enum: 0: released 1: pressed		
4	4	DB0.3...DB0.0	Not Used (= 0)					

F6-04: Position Switch, Home and Office Application

RORG	F6	RPS Telegram
FUNC	04	Position Switch, Home and Office Application
TYPE	01	Key Card Activated Switch

Insertion of Key Card generates an N-Message, take-out a U-Message

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	1

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB0.7...DB0.0	Key Card	KC	...	Enum: 112: inserted (0x70)		

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	0

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB0.7...DB0.0	Key Card	KC	...	Enum: 0: taken out		

RORG	F6	RPS Telegram
FUNC	04	Position Switch, Home and Office Application
TYPE	02	Key Card Activated Switch ERP2

Submitter: EnOcean GmbH

When card is inserted field EBO and SOC are both having value 1. When take out, both are having value 0. This coding is required to have a context less translation of RPS profiles between ERP 1 and ERP 2.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	DB0.7	Energy Bow	EBO	State of the energy bow	Enum: 0: taken out 1: card inserted		
1	1	DB0.6	Button coding	BC	Signalize button coding	Enum: 0: button		
2	3	DB0.5...DB0.3	Not Used (= 0)					
5	1	DB0.2	State of card	SOC	State of the card	Enum: 0: taken out 1: card inserted		
6	2	DB0.1...DB0.0	Not Used (= 0)					

F6-05: Detectors

RORG	F6	RPS Telegram
FUNC	05	Detectors
TYPE	00	Wind Speed Threshold Detector

Submitter: ViCOS GmbH

Description
This profile is used to communicate wind speed threshold detection.

The "Alarm ON" message shall be sent when the wind speed exceeds the threshold longer than the specified Delay_Time_AlarmON. If wind speed falls below the specified threshold longer than Delay_Time_AlarmOFF the "Alarm OFF" message shall be sent.

Delay time and threshold have to be set on the device.

Delay_Time_AlarmON: 1 … 15 s (resolution 1 s)
Delay_Time_AlarmOFF: 1 … 15 min (resolution 1 min)
Threshold: 0 … 255 km/h

To ensure that the receiver gets the "Alarm On" message under any condition (e.g. AC mains failure), it shall be sent every 60 s in alarm state.

When changing to "Alarm OFF" state the "Alarm OFF" messages shall be sent at least 2 times to avoid losing the "Alarm OFF" signal.

During "Alarm OFF" state the "Alarm OFF" message shall be repeated every 20 minutes.

In case of low energy, the "Energy LOW" message shall be sent every 60 minutes.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: in case of detection
Trigger event: detection
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: RPS teach-in (3 messages within 2s)

Security
Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB0.7...DB0.0	Status	WND	Status of detection and battery	Enum: 0x00: Wind speed below threshold (Alarm OFF) 0x10: Wind speed exceeds threshold (Alarm ON) 0x30: Energy LOW		

RORG	F6	RPS Telegram
FUNC	05	Detectors
TYPE	01	Liquid Leakage Sensor (mechanic harvester)

Submitter: Afriso / EnOcean

Description:
This profile is used for devices detecting leakage. It is commonly placed on ground where a leakage causes damage. The principle is that "paper rings" swell in water and trigger an ECO 200 (generator) based transmitter.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: NA
Trigger event: (water detection)
Teach-in method: RPS teach-in

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	1

Datafield:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB0.7...DB0.0	Water sensor	WAS	Alert signal that the sensor detected water leakage	Enum: 0x11: Water detected		

RORG	F6	RPS Telegram
FUNC	05	Detectors
TYPE	02	Smoke Detector

Submitter: ViCOS GmbH

Description
This profile is used to communicate smoke detection.

The "Alarm ON" message shall be sent immediately when smoke is detected. If smoke detection ends, the "Alarm OFF" message shall be sent.

To ensure that the receiver gets the "Alarm ON" message under any condition (e.g. AC mains failure), it shall be sent every 10 s in alarm state. When changing to "Alarm OFF" state the "Alarm OFF" messages shall be sent at least 2 times to avoid losing the "Alarm OFF" signal.

During "Alarm OFF" state the "Alarm OFF" message shall be repeated every 20 minutes.

In case of low energy, the "Energy LOW" message shall be sent.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: in case of detection
Trigger event: detection
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: RPS teach-in (3 messages within 2s)

Security
Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB0.7...DB0.0	Status	SMO	Status of detection and battery	Enum: 0x00: Smoke Alarm OFF 0x10: Smoke Alarm ON 0x30: Energy LOW		

F6-10: Mechanical Handle

RORG	F6	RPS Telegram
FUNC	10	Mechanical Handle
TYPE	00	Window Handle

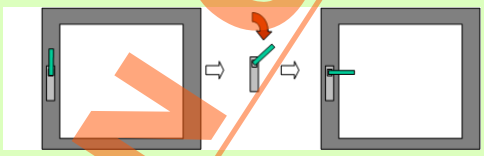
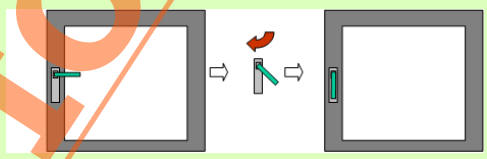
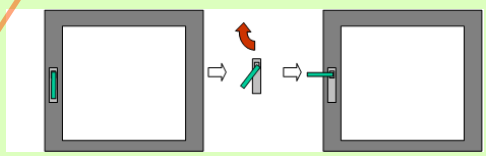
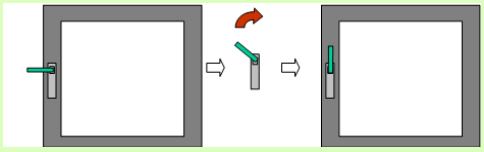
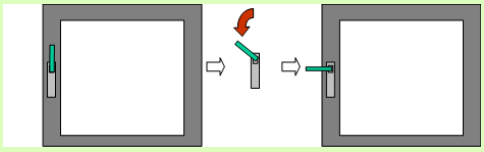
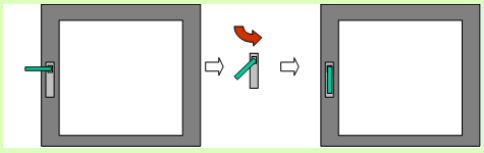
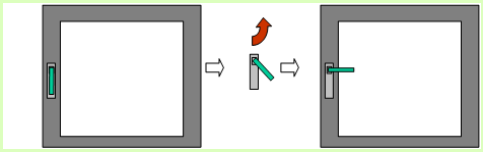
Submitter: HOPPE AG

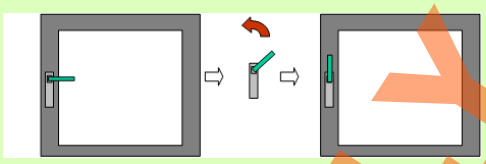
The bits marked with 'X' in DB_0 should not be checked. These bits can be '1' or '0' and should not be assumed to be a defined value, because both of them are allowed and not predictable!

Statusfield:

Offset	Size	Data	Value
2	1	T21	1
3	1	NU	0

Datafield:

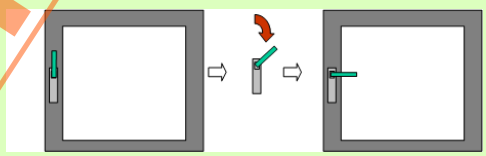
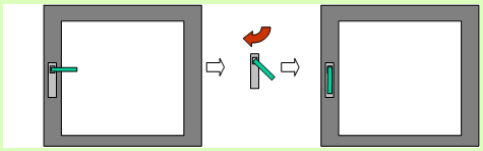
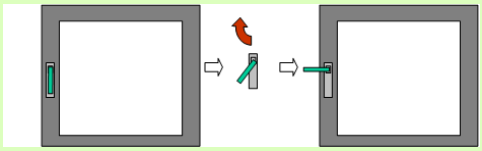
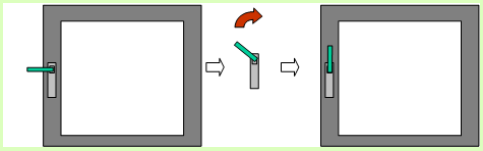
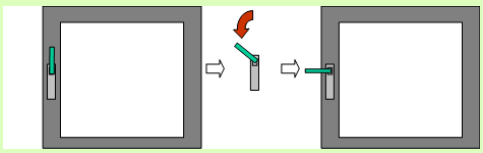
Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB0.7...DB0.0	Window handle	WIN	Movement of the window handle	Enum: 0b11X0XXXX: Moved from up to right.  0b1111XXXX: Moved from right to down.  0b11X0XXXX: Moved from down to left.  0b1101XXXX: Moved from left to up.  0b11X0XXXX: Moved from up to left.  0b1111XXXX: Moved from left to down.  0b11X0XXXX: Moved from down to right. 		

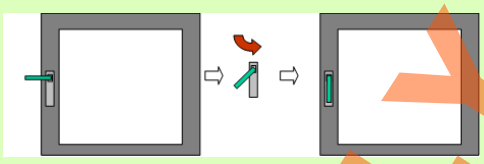
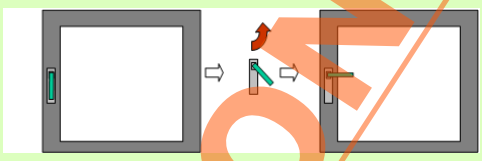
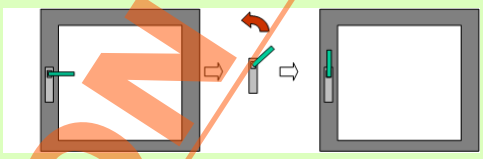
						0b1101XXXX: Moved from right to up. 

RORG	F6	RPS Telegram
FUNC	10	Mechanical Handle
TYPE	01	Window Handle ERP2

Submitter: HOPPE AG

DB0.6 – needs to show that RPS/ERP2 has a different coding as RPS/ERP1.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	DB0.7	Not Used (= 0)					
1	1	DB0.6	Handle coding	HC	Signalize window handle coding	Enum: 1: handle		
2	2	DB0.5...DB0.4	Not Used (= 0)					
4	4	DB0.3...DB0.0	Handle value	HVL	Value of the 4MSB of the Data field of ERP1 coding	Enum: 0b11X0: Moved from up to right.  0b1111: Moved from right to down.  0b11X0: Moved from down to left.  0b1101: Moved from left to up.  0b11X0: Moved from up to left. 		

						0b1111: Moved from left to down.  0b11X0: Moved from down to right.  0b1101: Moved from right to up. 

D5: 1BS Telegram

D5-00: Contacts and Switches

RORG	D5	**1BS Telegram**
FUNC	00	Contacts and Switches
TYPE	01	Single Input Contact

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
4	1	DB0.3	Learn Button	LRN	..	Enum: 0: pressed 1: not pressed		
7	1	DB0.0	Contact	CO		Enum: 0: open 1: closed		

A5: 4BS Telegram

A5-02: Temperature Sensors

RORG	A5	**4BS Telegram**
FUNC	02	Temperature Sensors
TYPE	01	Temperature Sensor Range -40°C to 0°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					

16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-40...0	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	02	Temperature Sensors
TYPE	02	Temperature Sensor Range -30°C to +10°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-30...+10	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	02	Temperature Sensors
TYPE	03	Temperature Sensor Range -20°C to +20°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-20...+20	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	02	Temperature Sensors
TYPE	04	Temperature Sensor Range -10°C to +30°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-10...+30	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	05	Temperature Sensor Range 0°C to +40°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	06	Temperature Sensor Range +10°C to +50°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+10...+50	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	07	Temperature Sensor Range +20°C to +60°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+20...+60	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	08	Temperature Sensor Range +30°C to +70°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit

0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+30...+70	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	02	Temperature Sensors
TYPE	09	Temperature Sensor Range +40°C to +80°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+40...+80	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	02	Temperature Sensors
TYPE	0A	Temperature Sensor Range +50°C to +90°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+50...+90	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	02	Temperature Sensors
TYPE	0B	Temperature Sensor Range +60°C to +100°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+60...+100	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	10	Temperature Sensor Range -60°C to +20°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-60...+20	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	11	Temperature Sensor Range -50°C to +30°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-50...+30	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	12	Temperature Sensor Range -40°C to +40°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-40...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	13	Temperature Sensor Range -30°C to +50°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-30...+50	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	14	Temperature Sensor Range -20°C to +60°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-20...+60	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	15	Temperature Sensor Range -10°C to +70°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	-10...+70	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	16	Temperature Sensor Range 0°C to +80°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+80	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	17	Temperature Sensor Range +10°C to +90°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+10...+90	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	18	Temperature Sensor Range +20°C to +100°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+20...+100	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	19	Temperature Sensor Range +30°C to +110°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+30...+110	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	1A	Temperature Sensor Range +40°C to +120°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+40...+120	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	1B	Temperature Sensor Range +50°C to +130°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	+50...+130	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	20	10 Bit Temperature Sensor Range -10°C to +41.2°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	14	DB3.7...DB2.2	Not Used (= 0)					
14	10	DB2.1...DB1.0	Temperature	TMP	Temperature (linear)	1023...0	-10...+41.2	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	02	Temperature Sensors
TYPE	30	10 Bit Temperature Sensor Range -40°C to +62.3°C

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	14	DB3.7...DB2.2	Not Used (= 0)					
14	10	DB2.1...DB1.0	Temperature	TMP	Temperature (linear)	1023...0	-40...+62.3	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

A5-04: Temperature and Humidity Sensor

RORG	A5	**4BS Telegram**
FUNC	04	Temperature and Humidity Sensor
TYPE	01	Range 0°C to +40°C and 0% to 100%

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	T-Sensor	TSN	Availability of the Temperature Sensor	Enum: 0: not available 1: available		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	04	Temperature and Humidity Sensor
TYPE	02	Range -20°C to +60°C and 0% to 100%

Submitter: Eltako

Description:
In contrast to EEP A5-04-01, the temperature range is extended: -20°C…+60°C.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: -
Trigger event: change in temperature, change in humidity
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in

Security
Encryption supported: -
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	-20...+60	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					

30	1	DB0.1	T-Sensor	TSN	Availability of the Temperature Sensor	Enum: 0: not available 1: available
31	1	DB0.0	Not Used (= 0)			

RORG	A5	**4BS Telegram**
FUNC	04	Temperature and Humidity Sensor
TYPE	03	Range -20°C to +60°C 10bit-measurement and 0% to 100%

Submitter: ITEC

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: 20 seconds – 1 hour (one time configuration)
Trigger event: threshold/delta for observed value, heartbeat
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: -
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Humidity	HUM	Rel. Humidity (linear)	0...255	0...100	%
8	6	DB2.7...DB2.2	Not Used (= 0)					
14	10	DB2.1...DB1.0	Temperature	TMP	Temperature (linear)	0...1023	-20...+60	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Telegram Type	TTP	Telegram Type	Enum: 0: Heartbeat 1: Event triggered		

A5-05: Barometric Sensor

RORG	A5	**4BS Telegram**
FUNC	05	Barometric Sensor
TYPE	01	Range 500 to 1150 hPa

Submitter: ITEC

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: 20 seconds – 1 hour (one time configuration)
Trigger event: threshold/delta for observed value, heartbeat
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security

Encryption supported: -
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	6	DB3.7...DB3.2	Not Used (= 0)					
6	10	DB3.1...DB2.0	Barometer	BAR	Barometer (linear)	0...1023	500...1150	hPa
16	12	DB1.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Telegram Type	TTP	Telegram Type	Enum: 0: Heartbeat 1: Event triggered		

A5-06: Light Sensor

RORG	A5	**4BS Telegram**
FUNC	06	Light Sensor
TYPE	01	Range 300lx to 60.000lx

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...255	0...5.1	V
8	8	DB2.7...DB2.0	Illumination	ILL2	Illumination (linear)	0...255	300...30000	lx
16	8	DB1.7...DB1.0	Illumination	ILL1	Illumination (linear)	0...255	600...60000	lx
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Range select	RS	Range	Enum: 0: Range acc. to DB_1 (ILL1) 1: Range acc. to DB_2 (ILL2)		

RORG	A5	**4BS Telegram**
FUNC	06	Light Sensor
TYPE	02	Range 0lx to 1.020lx

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...255	0...5.1	V
8	8	DB2.7...DB2.0	Illumination	ILL2	Illumination (linear)	0...255	0...510	lx
16	8	DB1.7...DB1.0	Illumination	ILL1	Illumination (linear)	0...255	0...1020	lx
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Range select	RS	Range	Enum: 0: Range acc. to DB_1 (ILL1) 1: Range acc. to DB_2 (ILL2)		

RORG	A5	4BS Telegram
FUNC	06	Light Sensor
TYPE	03	10-bit measurement (1-Lux resolution) with range 0lx to 1000lx

Submitter: Lutuo Technology

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear) 251...255: reserved for error code	0...250	0...5.0	V
8	10	DB2.7...DB1.6	Illumination	ILL	Illumination (linear) DB2 = 8 MSB, DB1 = 2 LSB 1001: over range, 1002...1024: reserved	0...1000	0...1000	lx
18	10	DB1.5...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	06	Light Sensor
TYPE	04	Curtain Wall Brightness Sensor

Submitter: Echoflex Solutions

Description
This EEP is intended for use with wireless daylight sensors, who communicate exterior light levels back to a blind controller.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: time-triggered and upon lux sensor reading change of more than a few percent
Communication interval: A telegram is transmitted every 1 minute in “day mode” and every 1 hour in “night mode”. If the measured light is below a certain threshold for several minutes the sensor goes to night mode.
Trigger event: Heartbeat, change of lux reading
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Temperature	TEMP	Ambient Temperature	0...255	-20...+60	°C
8	16	DB2.7...DB1.0	Illuminance	ILL	Illuminance (linear)	0...65535	0...65535	lx
24	4	DB0.7...DB0.4	Energy Storage	SV	Energy Storage	0...15	0...100	%
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					

30	1	DB0.1	Temperature Availability	TMPAV	Valid temperature data available on DB3	Enum: 0: Temperature data is unavailable 1: Temperature data is available
31	1	DB0.0	Energy Storage Availability	ENAV	Valid energy storage data available on DB0	Enum: 0: Energy storage data is unavailable 1: Energy storage data is available

RORG	A5	**4BS Telegram**
FUNC	06	Light Sensor
TYPE	05	Range 0lx to 10.200lx

Submitter: ITEC

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: 20 seconds – 1 hour (one time configuration)
Trigger event: threshold/delta for observed value, heartbeat
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...255	0...5.1	V
8	8	DB2.7...DB2.0	Illumination	ILL2	Illumination (linear)	0...255	0...5100	lx
16	8	DB1.7...DB1.0	Illumination	ILL1	Illumination (linear)	0...255	0...10200	lx
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Range select	RS	Range	Enum: 0: Range acc. to DB_1 (ILL1) 1: Range acc. to DB_2 (ILL2)		

A5-07: Occupancy Sensor

RORG	A5	**4BS Telegram**
FUNC	07	Occupancy Sensor
TYPE	01	Occupancy with Supply voltage monitor

Submitter: Lutuo Technology

The transmission of "PIR off" telegrams is optional.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit

0	8	DB3.7...DB3.0	Supply voltage (OPTIONAL)	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	PIR Status	PIRS	PIR Status	Enum: 0...127: PIR off 128...255: PIR on		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Supply voltage availability	SVA	Supply voltage availability at DB_3	Enum: 0: Supply voltage is not supported 1: Supply voltage is supported		

RORG	A5	**4BS Telegram**
FUNC	07	Occupancy Sensor
TYPE	02	Occupancy with Supply voltage monitor

Submitter: Lutuo Technology

The transmission of "PIR off" telegrams is optional.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage (REQUIRED)	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	16	DB2.7...DB1.0	Not Used (= 0)					
24	1	DB0.7	PIR Status	PIRS	PIR Status	Enum: 0: Uncertain of occupancy status 1: Motion detected		
25	3	DB0.6...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	07	Occupancy Sensor
TYPE	03	Occupancy with Supply voltage monitor and 10-bit illumination measurement

Submitter: Lutuo Technology

The transmission of "PIR off" telegrams is optional.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage (REQUIRED)	SVC	Supply voltage (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	10	DB2.7...DB1.6	Illumination	ILL	Illumination (linear); DB2 = 8 MSB, DB1 = 2 LSB	0...1000	0...1000	lx

					1001: over range, 1002...1024: reserved			
18	6	DB1.5...DB1.0	Not Used (= 0)					
24	1	DB0.7	PIR Status	PIRS	PIR Status	Enum: 1: Motion detected 0: Uncertain of occupancy status		
25	3	DB0.6...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

A5-08: Light, Temperature and Occupancy Sensor

RORG	A5	**4BS Telegram**
FUNC	08	Light, Temperature and Occupancy Sensor
TYPE	01	Range 0lx to 510lx, 0°C to +51°C and Occupancy Button

E.g. for ceiling suspended sensor.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...255	0...5.1	V
8	8	DB2.7...DB2.0	Illumination	ILL	Illumination (linear)	0...255	0...510	lx
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	0...+51	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	PIR Status	PIRS	PIR Status	Enum: 0: PIR on 1: PIR off		
31	1	DB0.0	Occupancy Button	OCC	...	Enum: 0: Button pressed 1: Button released		

RORG	A5	**4BS Telegram**
FUNC	08	Light, Temperature and Occupancy Sensor
TYPE	02	Range 0lx to 1020lx, 0°C to +51°C and Occupancy Button

E.g. for wall mounted sensor.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...255	0...5.1	V
8	8	DB2.7...DB2.0	Illumination	ILL	Illumination (linear)	0...255	0...1020	lx
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	0...+51	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					

30	1	DB0.1	PIR Status	PIRS	PIR Status	Enum: 0: PIR on 1: PIR off
31	1	DB0.0	Occupancy Button	OCC	...	Enum: 0: Button pressed 1: Button released

RORG	A5	**4BS Telegram**
FUNC	08	Light, Temperature and Occupancy Sensor
TYPE	03	Range 0lx to 1530lx, -30°C to +50°C and Occupancy Button

E.g. for outdoor sensor.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...255	0...5.1	V
8	8	DB2.7...DB2.0	Illumination	ILL	Illumination (linear)	0...255	0...1530	lx
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	-30...+50	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	PIR Status	PIRS	PIR Status	Enum: 0: PIR on 1: PIR off		
31	1	DB0.0	Occupancy Button	OCC	..	Enum: 0: Button pressed 1: Button released		

A5-09: Gas Sensor

RORG	A5	**4BS Telegram**
FUNC	09	Gas Sensor
TYPE	02	CO-Sensor 0 ppm to 1020 ppm

Submitter: Unitronic AG

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...255	0...5.1	V
8	8	DB2.7...DB2.0	Concentration	Conc	Gas concentration	0...255	0...1020	ppm
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	0...+51	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	T-Sensor	TSN	..	Enum: 0: Temperature Sensor not available 1: Temperature Sensor available		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	09	Gas Sensor
TYPE	04	CO2 Sensor

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Humidity	HUM	Rel. Humidity (linear), 0.5 % = 1 bit	0...200	0...100	%
8	8	DB2.7...DB2.0	Concentration	Conc	Concentration (linear), increment = 10 ppm	0...255	0...2550	ppm
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear), increment = 0.2 °C	0...255	0...+51.0	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	H-Sensor	HSN	..	Enum: 0: Humidity Sensor not available 1: Humidity Sensor available		
30	1	DB0.1	T-Sensor	TSN	..	Enum: 0: Temperature Sensor not available 1: Temperature Sensor available		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	09	Gas Sensor
TYPE	05	VOC Sensor

Submitter: NanoSense

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	VOC	Conc	VOC Concentration	0...65535	0...65535	ppb
16	8	DB1.7...DB1.0	VOC ID	VOC_ID	VOC identification	Enum: 0: VOCT (total) 1: Formaldehyde 2: Benzene 3: Styrene 4: Toluene 5: Tetrachloroethylene 6: Xylene 7: n-Hexane 8: n-Octane 9: Cyclopentane 10: Methanol 11: Ethanol 12: 1-Pentanol 13: Acetone 14: ethylene Oxide 15: Acetaldehyde ue 16: Acetic Acid 17: Propionice Acid 18: Valeric Acid 19: Butyric Acid 20: Ammoniac		

						22: Hydrogen Sulfide 23: Dimethylsulfide 24: 2-Butanol (butyl Alcohol) 25: 2-Methylpropanol 26: Diethyl ether 255: ozone
24	4	DB0.7...DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Not Used (= 0)			
30	2	DB0.1...DB0.0	Scale Multiplier	SCM	Scale Multiplier	Enum: 0: 0.01 1: 0.1 2: 1 3: 10

RORG	A5	**4BS Telegram**
FUNC	09	Gas Sensor
TYPE	06	Radon

Submitter: NanoSense

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	10	DB3.7...DB2.6	Radon	Act	Radon activity (regulation is an average of 100 Bq/m3/24h)	0...1023	0...1023	Bq/m3
10	18	DB2.5...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	09	Gas Sensor
TYPE	07	Particles

Submitter: NanoSense

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	9	DB3.7...DB2.7	Particles_10	PM10	Dust less than 10 µm (PM10)	0...511	0...511	µg/m3
9	9	DB2.6...DB1.6	Particles_2.5	PM2.5	Dust less than 2.5 µm (PM2.5)	0...511	0...511	µg/m3
18	9	DB1.5...DB0.5	Particles_1	PM1	Dust less than 1 µm (PM1)	0...511	0...511	µg/m3
27	1	DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	PM10 active	PM10a		Enum: 0: PM10 not active 1: PM10 active		
30	1	DB0.1	PM2.5 active	PM2.5a		Enum: 0: PM2.5 not active 1: PM2.5 active		

31	1	DB0.0	PM1 active	PM1a		Enum: 0: PM1 not active 1: PM1 active

RORG	A5	**4BS Telegram**
FUNC	09	Gas Sensor
TYPE	08	Pure CO2 Sensor

Submitter: Afriso / EnOcean

Description
Pure CO2 sensor with 8 bit resolution and 0 – 2000ppm.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Trigger event: change of value over threshold, heartbeat
Teach-in method: 4BS teach-in 2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	CO2	CO2	CO2 measurement	0...255	0...2000	ppm
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	09	Gas Sensor
TYPE	09	Pure CO2 Sensor with Power Failure Detection

Submitter: Afriso / EnOcean

Description
Pure CO2 sensor with 8 bit resolution and 0 – 2000ppm.
1 digital Input – Power failure detection.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Trigger event: change of value over threshold, heartbeat, change of digital Input
Teach-in method: 4BS teach-in 2

Remark
Power failure detection expresses that the device was cut from power source (unplugged / general power failure) and the device will probably stop functioning very soon. In this case the measured value CO2 is the last valid value.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	CO2	CO2	CO2 measurement	0...255	0...2000	ppm
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Power Failure detection	PFD	Indicates if power supply has a failure / is not available	Enum: 0: Power failure not detected		

						1: Power failure detected
30	2	DB0.1...DB0.0	Not Used (= 0)			

RORG	A5	4BS Telegram
FUNC	09	Gas Sensor
TYPE	0A	Hydrogen Gas Sensor

Submitter: SiMICS

Description
Hydrogen Gas Sensor with 16 bit resolution and 0-2000 ppm

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: -
Trigger event: change in gas concentration and temp
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: yes
Security level format: PSK, RLC, AES128

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Concentration	Conc	Gas concentration	0...65535	0...65535	ppm
16	8	DB1.7...DB1.0	Temperature	TEMP	Temperature (linear)	0...255	-20...+60	°C
24	4	DB0.7...DB0.4	Supply voltage	SV	Supply voltage / super cap.	0...15	2.0...5.0	V
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Temp sensor availability	TSA	Temp sensor availability at TMP	Enum: 0: Temp sensor is not supported 1: Temp sensor is supported		
31	1	DB0.0	Supply voltage availability	SVA	Supply voltage availability at SV	Enum: 0: Supply voltage is not supported 1: Supply voltage is supported		

RORG	A5	4BS Telegram
FUNC	09	Gas Sensor
TYPE	0B	Radioactivity Sensor

Submitter: SiMICS

Description
Radioactivity Sensor

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: -

Trigger event: change in radioactivity level
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: yes
Security level format: PSK, RLC, AES128

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	DB3.7...DB3.4	Supply voltage	SV	Supply voltage / super cap.	0...15	2.0...5.0	V
4	4	DB3.3...DB3.0	Not Used (= 0)					
8	16	DB2.7...DB1.0	Radioactivity	Ract	Radiation level	0...65535	0...6553	According to
24	4	DB0.7...DB0.4	Scale Multiplier	SCM	Scale Multiplier	Enum: 0: 0.001 1: 0.01 2: 0.1 3: 1 4: 10 5: 100 6: 1000 7: 10000 8: 100000		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Value unit	VUNIT	The unit of the radiation level	Enum: 0: µSv/h 1: cpm 2: Bq/L 3: Bq/kg		
31	1	DB0.0	Supply voltage availability	SVA	Supply voltage availability at SV	Enum: 0: Supply voltage is not supported 1: Supply voltage is supported		

RORG	A5	4BS Telegram
FUNC	09	Gas Sensor
TYPE	0C	VOC Sensor

Submitter: NanoSense

Description
Since this EEP has been released, Total VOC has been regulated by ISO standard. ISO 16000-29 is using weight per cubic metre instead of concentration. This update is for using free bits of this EEP to choose between ppb and µg/m3. Therefore the updated EEP will be compatible with previous version and will provide compliance with ISO standard. Some new VOC have been added in the list especially Naphthalene that will be soon regulated in certain European countries and 4-Phenylcyclohexene because it is part of the LEED (National rating system for sustainable buildings for North America).

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: -
Trigger event: value change or time
Tx delay: -
Rx timeout: -

Teach-in

Teach-in method: 4BS teach-in 2

Security
Encryption supported: no
Security level format: -

*: For instance, Monthly means the last or the forecast cost of consumption of the last or the next month.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	VOC	Conc	VOC concentration	0...65535	0...65535	according to **Unit**
16	8	DB1.7...DB1.0	VOC ID*	VOC ID	VOC identification	Enum: 0: VOCT (total) 1: Formaldehyde 2: Benzene 3: Styrene 4: Toluene 5: Tetrachloroethylene 6: Xylene 7: n-Hexane 8: n-Octane 9: Cyclopentane 10: Methanol 11: Ethanol 12: 1-Pentanol 13: Acetone 14: ethylene Oxide 15: Acetaldehyde ue 16: Acetic Acid 17: Propionice Acid 18: Valeric Acid 19: Butyric Acid 20: Ammoniac 22: Hydrogen Sulfide 23: Dimethylsulfide 24: 2-Butanol (butyl Alcohol) 25: 2-Methylpropanol 26: Diethyl ether 27: Naphthalene 28: 4-Phenylcyclohexene 29: Limonene 30: Trichloroethylene 31: Isovaleric acid 32: Indole 33: Cadaverine 34: Putrescine 35: Caproic acid 255: Ozone		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Unit	Unit	Unit of VOC concentration	Enum: 0: ppb 1: µg/m3		
30	2	DB0.1...DB0.0	Scale Multiplier	SCM	Scale multiplier	Enum: 0: 0.01 1: 0.1 2: 1 3: 10		

A5-10: Room Operating Panel

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	01	Temperature Sensor, Set Point, Fan Speed and Occupancy Control

Submitter: Kieback + Peter GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Turn-switch for fan speed	FAN	Turn-switch for fan speed	Enum: 210...255: Stage Auto 190...209: Stage 0 165...189: Stage 1 145...164: Stage 2 0...144: Stage 3		
8	8	DB2.7...DB2.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released 0: Button pressed		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	02	Temperature Sensor, Set Point, Fan Speed and Day/Night Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Turn-switch for fan speed	FAN	Turn-switch for fan speed	Enum: 210...255: Stage Auto 190...209: Stage 0 165...189: Stage 1 145...164: Stage 2 0...144: Stage 3		
8	8	DB2.7...DB2.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Slide switch 0/I	SLSW	Slide switch or Slide switch Day/Night	Enum: 0: Position I / Night / Off		

						1: Position O / Day / On

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	03	Temperature Sensor, Set Point Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	04	Temperature Sensor, Set Point and Fan Speed Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Turn-switch for fan speed	FAN	..	Enum: 210...255: Stage Auto 190...209: Stage 0 165...189: Stage 1 145...164: Stage 2 0...144: Stage 3		
8	8	DB2.7...DB2.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	05	Temperature Sensor, Set Point and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released 0: Button pressed		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	06	Temperature Sensor, Set Point and Day/Night Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Slide switch 0/I	SLSW	Slide switch or Slide switch Day/Night	Enum: 0: Position I / Night / Off 1: Position O / Day / On		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	07	Temperature Sensor, Fan Speed Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Turn-switch for fan speed	FAN	..	Enum: 210...255: Stage Auto 190...209: Stage 0 165...189: Stage 1 145...164: Stage 2 0...144: Stage 3		
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	08	Temperature Sensor, Fan Speed and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Turn-switch for fan speed	FAN	..	Enum: 210...255: Stage Auto 190...209: Stage 0 165...189: Stage 1 145...164: Stage 2 0...144: Stage 3		
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released 0: Button pressed		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	09	Temperature Sensor, Fan Speed and Day/Night Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Turn-switch for fan speed	FAN	..	Enum: 210...255: Stage Auto 190...209: Stage 0 165...189: Stage 1 145...164: Stage 2 0...144: Stage 3		
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Slide switch 0/I	SLSW	Slide switch or Slide switch Day/Night	Enum: 0: Position I / Night / Off 1: Position O / Day / On		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	0A	Temperature Sensor, Set Point Adjust and Single Input Contact

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Contact State	CTST	Contact state	Enum: 0: closed 1: open		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	0B	Temperature Sensor and Single Input Contact

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Contact State	CTST	Contact state	Enum: 0: closed 1: open		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	0C	Temperature Sensor and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released 0: Button pressed		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	0D	Temperature Sensor and Day/Night Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Slide switch	SLSW	Slide switch 0/I or Slide switch Day/Night	Enum: 0: Position I / Night / Off 1: Position O / Day / On		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	10	Temperature and Humidity Sensor, Set Point and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released 0: Button pressed		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	11	Temperature and Humidity Sensor, Set Point and Day/Night Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Slide switch	SLSW	Slide switch 0/I or Slide switch Day/Night	Enum: 0: Position I / Night / Off 1: Position O / Day / On		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	12	Temperature and Humidity Sensor and Set Point

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Set point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	13	Temperature and Humidity Sensor, Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released 0: Button pressed		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	14	Temperature and Humidity Sensor, Day/Night Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Slide switch	SLSW	Slide switch 0/I or Slide switch Day/Night	Enum: 0: Position I / Night / Off 1: Position O / Day / On		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	15	10 Bit Temperature Sensor, 6 bit Set Point Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	6	DB2.7...DB2.2	Set point	SP	Set point (6 bit, linear) Min.- ... Max+	0...63	0...63	N/A
14	10	DB2.1...DB1.0	Temperature	TMP	Temperature 10 bit (linear)	1023...0	-10...+41.2	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	16	10 Bit Temperature Sensor, 6 bit Set Point Control;Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	6	DB2.7...DB2.2	Set point	SP	Set point (linear) Min.- ... Max+	0...63	0...63	N/A
14	10	DB2.1...DB1.0	Temperature	TMP	Temperature 10 bit (linear)	1023...0	-10...+41.2	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released 0: Button pressed		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	17	10 Bit Temperature Sensor, Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	14	DB3.7...DB2.2	Not Used (= 0)					
14	10	DB2.1...DB1.0	Temperature	TMP	Temperature 10 bit (linear)	1023...0	-10...+41.2	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 1: Button released		

						0: Button pressed

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	18	Illumination, Temperature Set Point, Temperature Sensor, Fan Speed and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Illumination	ILL	Illumination (linear), 251: Over range, 252-255: reserved	0...250	0...1000	lx
8	8	DB2.7...DB2.0	Temp Setpoint	TMPSP	Temperature Set point (linear)	250...0	0...+40	°C
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	250...0	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	3	DB0.6...DB0.4	Fan Speed	FAN	Fan Speed	Enum: 0: Auto 1: Speed 0 2: Speed 1 3: Speed 2 4: Speed 3 5: Speed 4 6: Speed 5 7: Off		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Occupancy enable/disable	OED	Occupancy enable/disable; if occupancy is disabled ignore DB0.0 (occu. button)	Enum: 0: Occupancy enabled 1: Occupancy disabled		
31	1	DB0.0	Occupancy button	OB	...	Enum: 0: Button pressed 1: Button released		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	19	Humidity, Temperature Set Point, Temperature Sensor, Fan Speed and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
8	8	DB2.7...DB2.0	Temp Setpoint	TMP Sp	Temperature Set point (linear)	250...0	0...+40	°C
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	250...0	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	3	DB0.6...DB0.4	Fan speed	FAN	Fan Speed	Enum: 0: Auto 1: Speed 0 2: Speed 1		

						3: Speed 2 4: Speed 3 5: Speed 4 6: Speed 5 7: Off
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Not Used (= 0)			
30	1	DB0.1	Occupancy button	OB		Enum: 0: Button pressed 1: Button released
31	1	DB0.0	Occupancy enable/disable	OED		Enum: 0: Occupancy enabled 1: Occupancy disabled

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	1A	Supply voltage monitor, Temperature Set Point, Temperature Sensor, Fan Speed and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply Voltage	SV	0 ... 5.0 V linear (super cap); 251-255 reserved for error code	0...250	0...5	V
8	8	DB2.7...DB2.0	Temp Setpoint	TMP Sp	Temperature Set Point (linear)	250...0	0...+40	°C
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	250...0	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	3	DB0.6...DB0.4	Fan speed	FAN	Fan Speed	Enum: 0: Auto 1: Speed 0 2: Speed 1 3: Speed 2 4: Speed 3 5: Speed 4 6: Speed 5 7: Off		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Occupancy enable/disable	OED		Enum: 0: Occupancy enabled 1: Occupancy disabled		
31	1	DB0.0	Occupancy button	OB		Enum: 0: Button pressed 1: Button released		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	1B	Supply Voltage Monitor, Illumination, Temperature Sensor, Fan Speed and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply Voltage	SV	(super cap) 251 – 255 reserved for error code	0...250	0...5	V
8	8	DB2.7...DB2.0	Illumination	ILL	Illumination (linear), 251: Over range, 252-255: reserved	0...250	0...1000	lx
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	250...0	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	3	DB0.6...DB0.4	Fan speed	FAN	Fan Speed	Enum: 0: Auto 1: Speed 0 2: Speed 1 3: Speed 2 4: Speed 3 5: Speed 4 6: Speed 5 7: Off		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Occupancy enable/disable	OED		Enum: 0: Occupancy enabled 1: Occupancy disabled		
31	1	DB0.0	Occupancy button	OB		Enum: 0: Button pressed 1: Button released		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	1C	Illumination, Illumination Set Point, Temperature Sensor, Fan Speed and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Illumination	ILL	Illumination (linear), 251: Over range, 252-255: reserved	0...250	0...1000	lx
8	8	DB2.7...DB2.0	Illumination Set Point	ILLSP		0...250	0...1000	lx
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	250...0	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	3	DB0.6...DB0.4	Fan speed	FAN		Enum: 0: Auto 1: Speed 0 2: Speed 1		

						3: Speed 2 4: Speed 3 5: Speed 4 6: Speed 5 7: Off
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Not Used (= 0)			
30	1	DB0.1	Occupancy enable/disable	OED		Enum: 0: Occupancy enabled 1: Occupancy disabled
31	1	DB0.0	Occupancy button	OB		Enum: 0: Button pressed 1: Button released

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	1D	Humidity, Humidity Set Point, Temperature Sensor, Fan Speed and Occupancy Control

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
8	8	DB2.7...DB2.0	Humidity Set Point	HUMSP	Humidity Set Point (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	250...0	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	3	DB0.6...DB0.4	Fan speed	FAN	Fan Speed	Enum: 0: Auto 1: Speed 0 2: Speed 1 3: Speed 2 4: Speed 3 5: Speed 4 6: Speed 5 7: Off		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Occupancy enable/disable	OED		Enum: 0: Occupancy enabled 1: Occupancy disabled		
31	1	DB0.0	Occupancy button	OB		Enum: 0: Button pressed 1: Button released		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel

TYPE	1E	see A5-10-1B

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	1F	Temperature Sensor, Set Point, Fan Speed, Occupancy and Unoccupancy Control

Submitter: Distech Controls

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Turn-switch for fan speed	FAN	Turn-switch for fan speed	Enum: 210...255: Stage auto 190...209: Stage 0 165...189: Stage 1 145...164: Stage 2 0...144: Stage 3		
8	8	DB2.7...DB2.0	Set Point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	255...0	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	1	DB0.6	Temperature flag	TMP_F	Temperature flag	Enum: 1: Temperature present 0: Temperature absent		
26	1	DB0.5	Set point flag	SP_F	Set point flag	Enum: 1: Set point present 0: Set point absent		
27	1	DB0.4	Fan speed flag	FAN_F	Fan speed flag	Enum: 1: Fan speed present 0: Fan speed absent		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Unoccupancy	UNOCC	Unoccupancy button	Enum: 0: Button pressed 1: Button released		
31	1	DB0.0	Occupancy	OCC	Occupancy button	Enum: 0: Button pressed 1: Button released		

RORG	A5	4BS Telegram
FUNC	10	Room Operating Panel
TYPE	20	Temperature and Set Point with Special Heating States

Submitter: MSR-Solutions GmbH, Wangen i.Allg.

Description:
Set Point for Heating Control, Temperature, User Activity.

This EEP defines a Room Operating Panel that contains a sensor for temperature measurement. The set point selector knob determines the desired room temperature with the ability to set special set point modes for heating control. User activity and the sensor's battery state are indicated in the telegram.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered

Communication intervall: 1200 s
Trigger event: change of any input signal
Tx delay: n/a
Rx timeout: 0 ms (minimum time between two received messages)
Teach-in method: 4BS teach-in 2 / Universal teach-in
Security Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Set Point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	1	DB0.7	Not Used (= 0)					
25	2	DB0.6...DB0.5	Set point mode	SPM	Selection of heating mode	Enum: 0: Room temperature defined by SP 1: Frost protection 2: Automatic control (e.g. defined by time program) 3: Reserved		
27	1	DB0.4	Battery state	BATT	Battery change needed	Enum: 0: Battery ok 1: Battery low		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	User activity	ACT	User intervention action on device	Enum: 0: No user action 1: User interaction		

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	21	Temperature, Humidity and Set Point with Special Heating States

Submitter: MSR-Solutions GmbH, Wangen i.Allg.

Description:
Set Point for Heating Control, Temperature, Humidity, User Activity.

This EEP defines a Room Operating Panel that contains sensors for temperature and humidity. The set point selector knob determines the desired room temperature with the ability to set special set point modes for heating control. User activity and the sensor's battery state are indicated in the telegram.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication intervall: 1200 s
Trigger event: change of any input signal
Tx delay: n/a
Rx timeout: 0 ms (minimum time between two received messages)
Teach-in method: 4BS teach-in 2 / Universal teach-in
Security Encryption required: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Set Point	SP	Set point (linear) Min.- ... Max+	0...255	0...255	N/A
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C

24	1	DB0.7	Not Used (= 0)			
25	2	DB0.6...DB0.5	Set point mode	SPM	Selection of heating mode	Enum: 0: Room temperature defined by SP 1: Frost protection 2: Automatic control (e.g. defined by time program) 3: Reserved
27	1	DB0.4	Battery state	BATT	Battery change needed	Enum: 0: Battery ok 1: Battery low
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	2	DB0.2...DB0.1	Not Used (= 0)			
31	1	DB0.0	User activity	ACT	User intervention action on device	Enum: 0: No user action 1: User interaction

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	22	Temperature, Setpoint, Humidity and Fan Speed

Submitter: Thermokon Sensortechnik GmbH

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: time-triggered (configurable at the device) & event-triggered
Trigger event: setpoint change, fan speed change
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: no
Security level format: -

Product Description
The device represented by this EEP is a "Room Operating Panel with Display". It is powered by solar cell.

It is equipped with the following features:
- Temperature Sensor
- Humidity Sensor
- Temperature Setpoint Adjustment
- Fanspeed Adjustment

For pairing the unidirectional "4BS Teach-In Variation 2" method is used.

The device transmits the actual sensor values periodically (Default: 1000s) or on an event like "Temperature Setpoint Adjustment" or "Fanspeed Adjustment".

Temperature Sensor, Humidity Sensor:
The environmental sensors are updated periodically (adjustable, default: 100s) and, if there is a change, the updated values will be send immediately.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Relative Setpoint	SP	Setpoint (linear) Min.- ... Max+	0...255	0...255	N/A
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%

16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	3	DB0.7...DB0.5	Fanspeed	FAN	Fanspeed	Enum: 0: Auto 1: Speed 0 / OFF 2: Speed 1 3: Speed 2 4: Speed 3 5 ... 7: Reserved		
27	1	DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	10	Room Operating Panel
TYPE	23	Temperature, Setpoint, Humidity, Fan Speed and Occupancy

Submitter: Thermokon Sensortechnik GmbH

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: time-triggered (configurable at the device) & event-triggered
Trigger event: setpoint change, fan speed change, change of occupancy-state
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: no
Security level format: -

Product Description
The device represented by this EEP is a "Room Operating Panel with Display". It is powered by solar cell.

It is equipped with the following features:
- Temperature Sensor
- Humidity Sensor
- Setpoint Adjustment
- Fanspeed Adjustment
- Occupancy-State Adjustment

For pairing the unidirectional "4BS Teach-In Variation 2" method is used.

The device transmits the actual sensor values periodically (Default: 1000s) or on an event like "Setpoint Adjustment" or "Fanspeed Adjustment".

Temperature Sensor, Humidity Sensor:
The environmental sensors are updated periodically (adjustable, default: 100s) and, if there is a change, the updated values will be send directly.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Relative Setpoint	SP	Setpoint (linear) Min.- ... Max+	0...255	0...255	N/A
8	8	DB2.7...DB2.0	Humidity	HUM	Rel. Humidity (linear)	0...250	0...100	%
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...250	0...+40	°C
24	3	DB0.7...DB0.5	Fanspeed	FAN	Fanspeed	Enum: 0: Auto 1: Speed 0 / OFF 2: Speed 1 3: Speed 2		

						4: Speed 3 5 ... 7: Reserved
27	1	DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	2	DB0.2...DB0.1	Not Used (= 0)			
31	1	DB0.0	Occupancy	OCC	Occupancy	Enum: 0: Unoccupied 1: Occupied

A5-11: Controller Status

RORG	A5	**4BS Telegram**
FUNC	11	Controller Status
TYPE	01	Lighting Controller

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Illumination	ILL	Illumination (linear)	0...255	0...510	lx
8	8	DB2.7...DB2.0	Illumination Set Point	ISP	Illumination Set Point (Min. ... Max.) (linear)	0...255	0...255	N/A
16	8	DB1.7...DB1.0	Dimming Output Level	DIM	Dimming Output Level (Min. ... Max.) (linear)	0...255	0...255	N/A
24	1	DB0.7	Repeater	REP	Repeater	Enum: 0: disabled 1: enabled		
25	1	DB0.6	Power Relay Timer	PRT	Power Relay Timer	Enum: 0: disabled 1: enabled		
26	1	DB0.5	Daylight Harvesting	DHV	Daylight Harvesting	Enum: 0: disabled 1: enabled		
27	1	DB0.4	Dimming	EDIM	Dimming	Enum: 0: switching load 1: dimming load		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Magnet Contact	MGC	Magnet Contact	Enum: 0: open 1: closed		
30	1	DB0.1	Occupancy	OCC	Occupancy	Enum: 0: unoccupied 1: occupied		
31	1	DB0.0	Power Relay	PWR	Power Relay	Enum: 0: off 1: on		

RORG	A5	**4BS Telegram**
FUNC	11	Controller Status

TYPE	02	Temperature Controller Output

Submitter: Thermokon Sensortechnik GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Control Variable	CVAR	Actual value of controller	0...255	0...100	%
8	8	DB2.7...DB2.0	FanStage	FAN	Actual value of fan	Enum: 0: Stage 0 Manual 1: Stage 1 Manual 2: Stage 2 Manual 3: Stage 3 Manual 16: Stage 0 Automatic 17: Stage 1 Automatic 18: Stage 2 Automatic 19: Stage 3 Automatic 255: Not Available		
16	8	DB1.7...DB1.0	Actual Setpoint	ASP	Occupied: Basic setpoint occupied + Setpoint shift + Sensor offset StandBy: Basic setpoint standBy + Setpoint shift Unoccupied: Basic setpoint unoccupied + setpoint shift	0...255	0...+51.2	°C
24	1	DB0.7	Alarm	ALR	In case of internal error alarm is set	Enum: 0: No alarm 1: Alarm		
25	2	DB0.6...DB0.5	Controller mode	CTM	Actual state of controller	Enum: 1: Heating 2: Cooling 3: Off		
27	1	DB0.4	Controller state	CST	Automatic control, or is controlled from another device	Enum: 0: Automatic 1: Override		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Energy hold-off	ERH	Stop control if window is opened	Enum: 0: Normal 1: Energy hold-off/ Dew point		
30	2	DB0.1...DB0.0	Room occupancy	RO	Actual room occupancy	Enum: 0: Occupied 1: Unoccupied 2: StandBy 3: Frost		

RORG	A5	4BS Telegram
FUNC	11	Controller Status
TYPE	03	Blind Status

Submitter: PEHA / infratec

This controller status is specific for blinds, awning and shutter modules. All modules can use this 4BS telegram to send all information about the status, the position and errors of the module, if these data are available.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Blind/shutter pos.	BSP		0...100	0...100	%
8	1	DB2.7	Angle sign	AS		Enum: 0: Positive sign 1: Negative sign		
9	7	DB2.6...DB2.0	Angle	AN	Angle in 2° steps (e.g. 0 = 0°, 90 = 180°) (EEP 2.6.5: valid range ~~0 ... 180~~ -> **0 ... 90** scale ~~0 ... 360~~ -> **0 ... 180**)	0...90	0...180	°
16	1	DB1.7	Position value flag	PVF		Enum: 0: No Position value available 1: Position value available		
17	1	DB1.6	Angle value flag	AVF		Enum: 0: No Angle value available 1: Angle value available		
18	2	DB1.5...DB1.4	Error state	ES		Enum: 0: No error present 1: End-positions are not configured 2: Internal failure 3: Not used		
20	2	DB1.3...DB1.2	End-position	EP		Enum: 0: No End-position available 1: No End-position reached 2: Blind fully open 3: Blind fully closed		
22	2	DB1.1...DB1.0	Status	ST		Enum: 0: No Status available 1: Blind is stopped 2: Blind opens 3: Blind closes		
24	1	DB0.7	Service Mode	SM		Enum: 0: Normal mode 1: Service mode is activated (For example for maintenance)		
25	1	DB0.6	Mode of the position	MOTP		Enum: 0: Normal mode: 0% Blind fully open / 100% Blind fully close 1: Inverse mode: 100% Blind fully open / 0% Blind fully close		
26	2	DB0.5...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	11	Controller Status
TYPE	04	Extended Lighting Status

Submitter: PEHA / infratec

This status is an extended answer of new lighting-controllers. All modules can use this 4BS telegram to send all information about the status and errors of the module, if these data are available.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Parameter 1	P1		Enum: Mode 0: Dimm-Value (0 .. 255) Mode 1: R - Red (0 .. 255) Mode 2: Energy metering value (MSB 15 .. 8) Mode 3: Not used		
8	8	DB2.7...DB2.0	Parameter 2	P2		Enum: Mode 0: Lamp operating hours (MSB 15 .. 8) Mode 1: G - Green (0 .. 255) Mode 2: Energy metering value (7 .. 0 LSB) Mode 3: Not used		
16	8	DB1.7...DB1.0	Parameter 3	P3		Enum: Mode 0: Lamp operating hours (7 .. 0 LSB) Mode 1: B - Blue (0 .. 255) Mode 2: Unit for energy values: Enum: 0 = mW 1 = W 2 = kW 3 = MW 4 = Wh 5 = kWh 6 = MWh 7 = GWh 8 = mA 9 = 1/10 A 10 = mV 11 = 1/10 V 12 .. 15 Not used Mode 3: Not used		
24	1	DB0.7	Service Mode	SM		Enum: 0: Normal mode 1: Service mode is activated. (For example for maintenance)		
25	1	DB0.6	Operating hours flag	OHF	For Mode 0	Enum: 0: No lamp operating hours available 1: Lamp operating hours available		
26	2	DB0.5...DB0.4	Error state	ES		Enum: 0: No error present 1: Lamp-failure 2: Internal failure 3: Failure on the external periphery		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Parameter Mode	PM		Enum: 0: 8 Bit Dimmer Value and Lamp operating hours 1: RGB Value 2: Energy metering value 3: Not used		
31	1	DB0.0	Status	ST		Enum: 0: Lighting off 1: Lighting on		

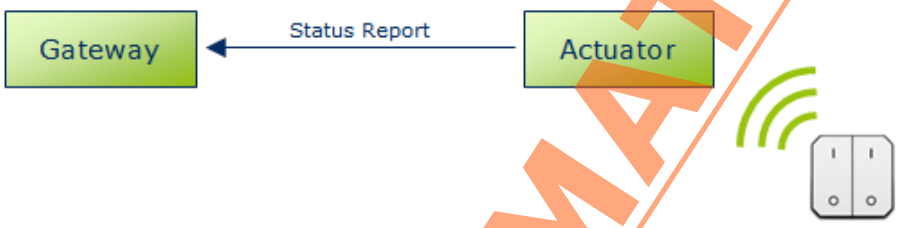
RORG	A5	**4BS Telegram**
FUNC	11	Controller Status
TYPE	05	Dual-Channel Switch Actuator (BI-DIR)

Submitter: Nanjing Putian Telecommunications CO., Ltd.,

Description
This EEP is used for sending the latest relay status (including current working mode) of a dual-channel switch actuator. The telegram is sent when the relay status changes or a gateway request is received. Each time the gateway is powered on, it will send a request telegram to request that the actuator reports its latest relay status, while in normal working state, it won't send any telegram to the actuator and only receive the relay status from the actuator.

1) Gateway first power on:

2) When the actuator receives a switch telegram and its status changes:



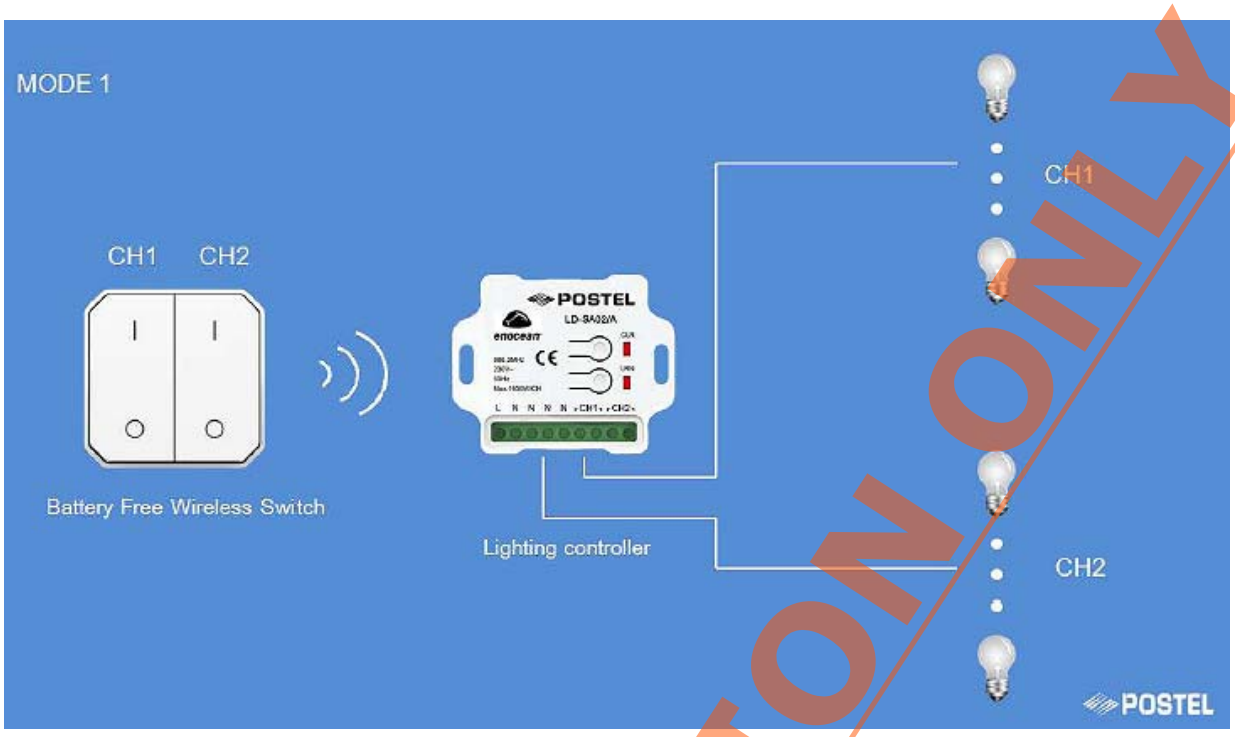
Data exchange
Direction: bi-directional
Addressing: broadcast
Communication trigger: event & request
Communication interval: -
Trigger event: change of relay status
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

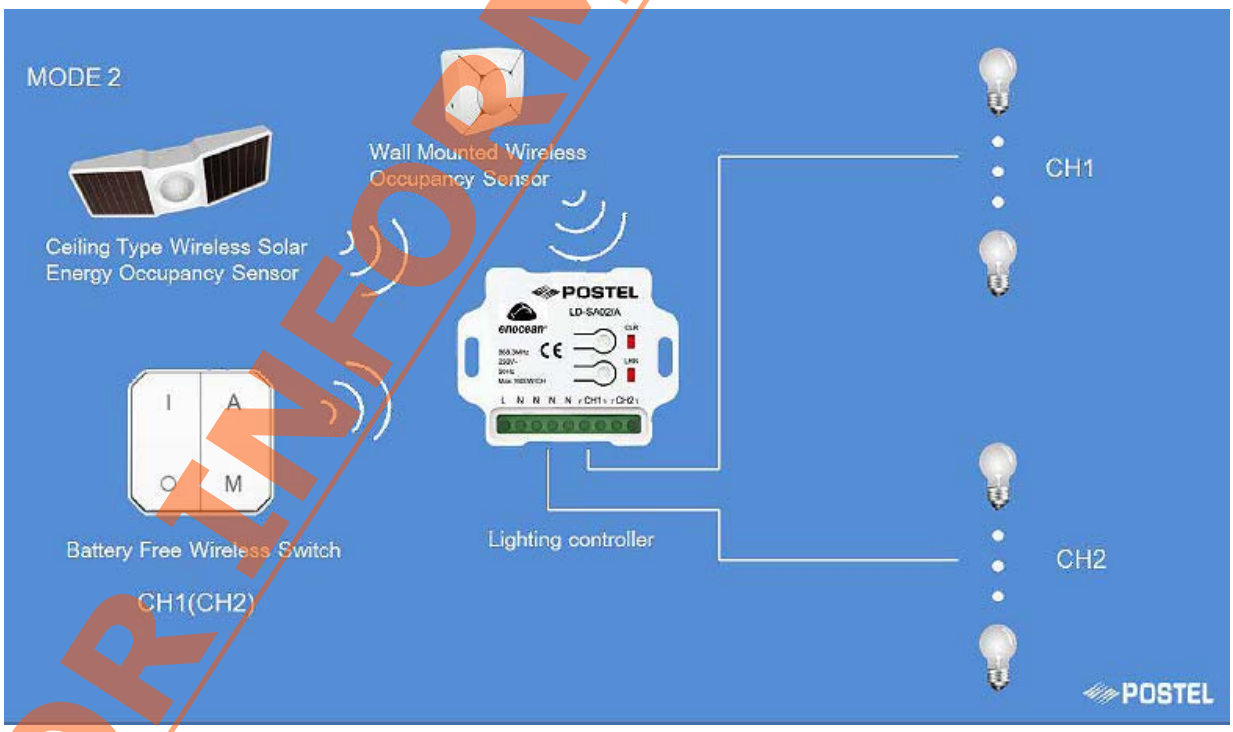
Security
Encryption supported: no
Security level format: -

Appendix
Operation mode description:

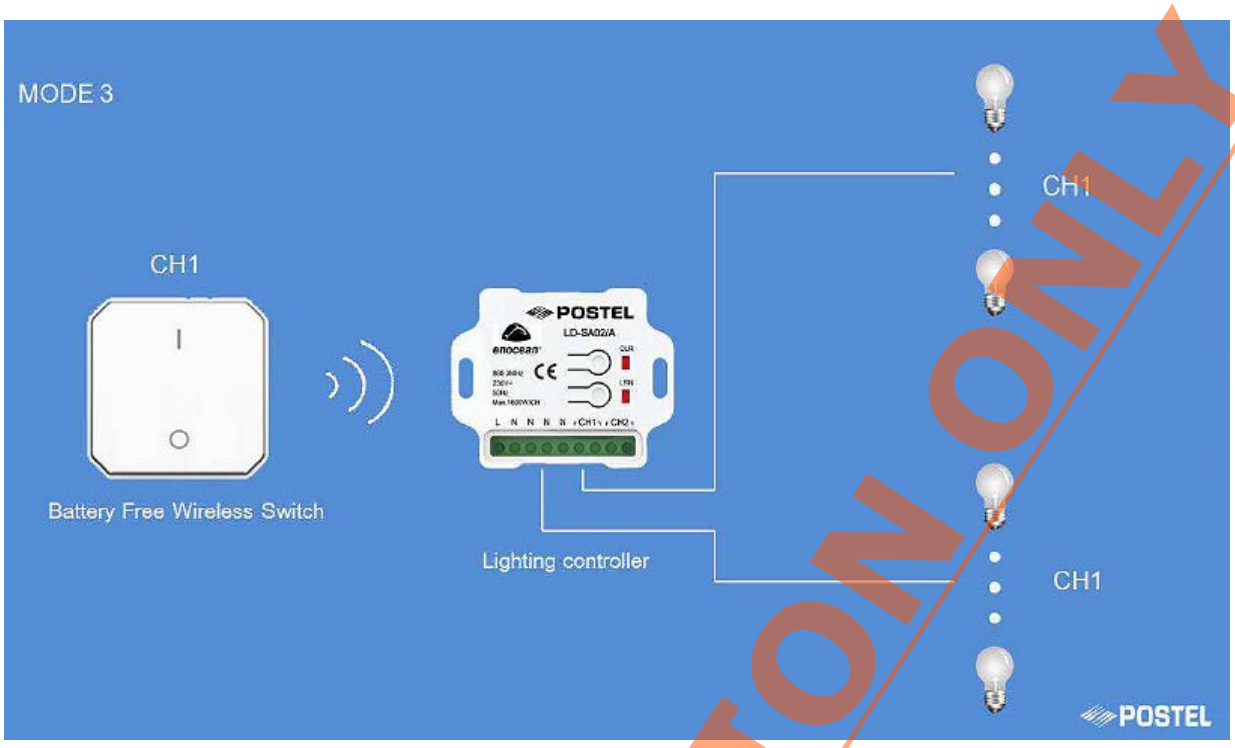
Mode 1:
One switch controls one dual-channel actuator. Each rock controls one channel.
I: power ON, O: power OFF



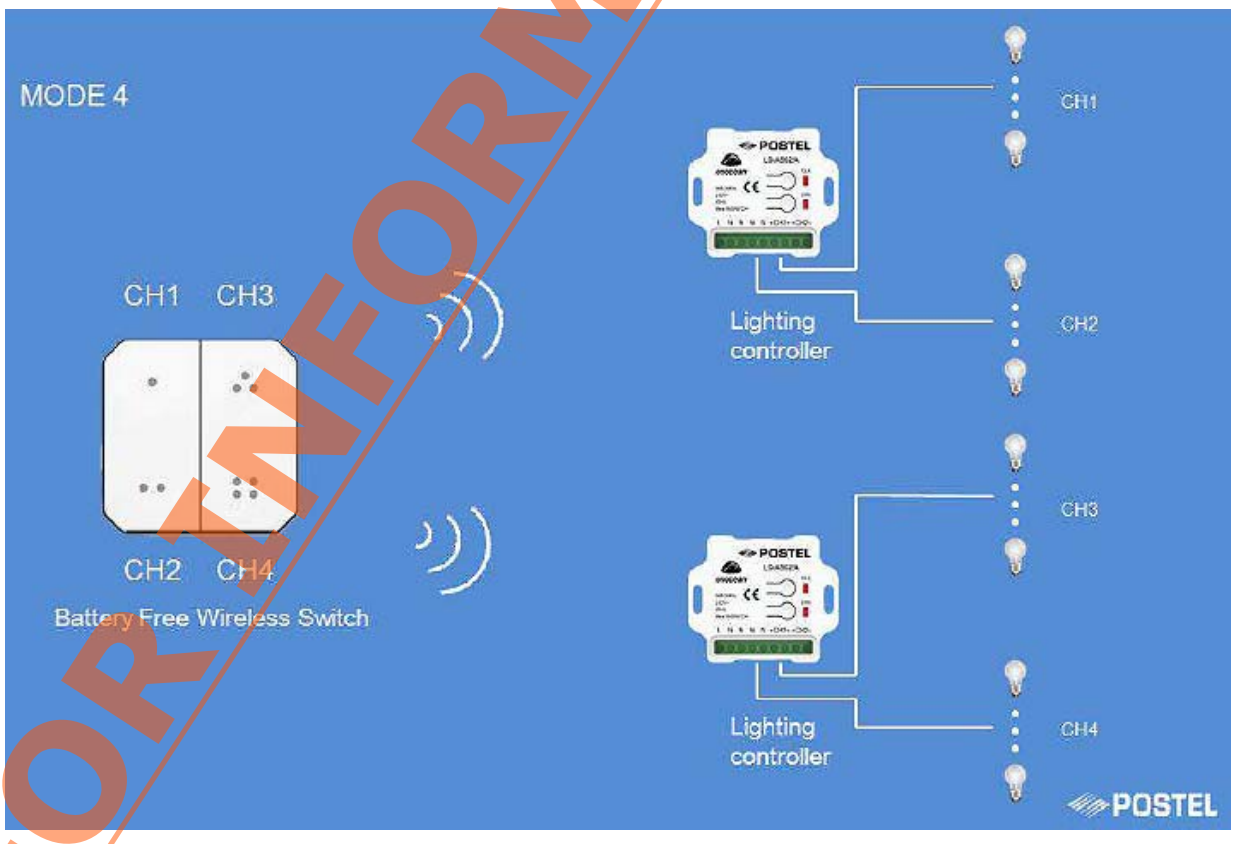
Mode 2:
In this mode, actuator can be controlled by both switch and occupancy sensor, also can be set "Auto" control by occupancy sensor or "Manual" control by switch through button "A" or "M". Each channel can be controlled independently.



Mode 3:
A bit like mode 1, but single rocker button controls two channels one time.



Mode 4:
One dual-rock switch button can control two dual-channel actuators as 4 channel lighting in all. We can control one channel only through trigger the rock angle.



DIRECTION-1 = Gateway request telegram; from gateway to actuator

DIRECTION-2 = Actuator status report; from actuator to gateway

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	28	DB3.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Message Type	MT	Defines if the telegram is a request or contains data	Enum: 0: Request		

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	25	DB3.7...DB0.7	Not Used (= 0)					
25	3	DB0.6...DB0.4	Working Mode	WM	Actuators current working mode	Enum: 0b001: mode 1 0b010: mode 2 0b011: mode 3 0b100: mode 4		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Relay Status	RS	Actuators current relay status Bit 0.1: CH1 Bit 0.2: CH2	Enum: 0b00: CH1 off, CH2 off 0b01: CH1 on, CH2 off 0b10: CH1 off, CH2 on 0b11: CH1 on, CH2 on		
31	1	DB0.0	Message Type	MT	Defines if the telegram is a request or contains data	Enum: 1: Status Report		

A5-12: Automated Meter Reading (AMR)

The meter reading is represented by 3 data bytes, a divisor and a flag that indicates it as a cumulative or a current value. A 4 bit info field gives additional information and is TYPE specific.

RORG	A5	**4BS Telegram**
FUNC	12	Automated Meter Reading (AMR)
TYPE	00	Counter

Submitter: EnOcean GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	24	DB3.7...DB1.0	Meter reading	MR	Current value or cumulative counter value	0...16777215	according to **DIV**	according to **DT**
24	4	DB0.7...DB0.4	Measurement channel	CH		0...15	0...15	1

28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Data type (unit)	DT	Current value or cumulative counter value	Enum: 0: Cumulative value 1 ... 1: Current value 1/s ...
30	2	DB0.1...DB0.0	Divisor (scale)	DIV	Divisor for counter value	Enum: 0: x/1 0...16777215 1: x/10 0...1677721.5 2: x/100 0...167772.15 3: x/1000 0...16777.215

RORG	A5	**4BS Telegram**
FUNC	12	Automated Meter Reading (AMR)
TYPE	01	Electricity

Submitter: EnOcean GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	24	DB3.7...DB1.0	Meter reading	MR	current value in W or cumulative value in kWh	0...16777215	according to **DIV**	according to **DT**
24	4	DB0.7...DB0.4	Tariff info	TI		0...15	0...15	1
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Data type (unit)	DT	Current value or cumulative value	Enum: 0: Cumulative value kWh ... 1: Current value W ...		
30	2	DB0.1...DB0.0	Divisor (scale)	DIV	Divisor for value	Enum: 0: x/1 0...16777215 1: x/10 0...1677721.5 2: x/100 0...167772.15 3: x/1000 0...16777.215		

RORG	A5	**4BS Telegram**
FUNC	12	Automated Meter Reading (AMR)
TYPE	02	Gas

Submitter: EnOcean GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	24	DB3.7...DB1.0	meter reading	MR	Cumulative value in m³ or Current value in liter/s	0...16777215	according to **DIV**	according to **DT**
24	4	DB0.7...DB0.4	Tariff info	TI		0...15	0...15	1

28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	data type (unit)	DT	Current value or cumulative value	Enum: 0: Cumulative value m³ ... 1: Current value liter/s ...
30	2	DB0.1...DB0.0	divisor (scale)	DIV	Divisor for value	Enum: 0: x/1 0...16777215 1: x/10 0...1677721.5 2: x/100 0...167772.15 3: x/1000 0...16777.215

RORG	A5	**4BS Telegram**
FUNC	12	Automated Meter Reading (AMR)
TYPE	03	Water

Submitter: EnOcean GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	24	DB3.7...DB1.0	Meter reading	MR	Cumulative value in m³ or Current value in liter/s	0...16777215	according to **DIV**	according to **DT**
24	4	DB0.7...DB0.4	Tariff info	TI		0...15	0...15	1
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Data type (unit)	DT	Current value or cumulative value	Enum: 0: Cumulative value m³ ... 1: Current value Liter/s ...		
30	2	DB0.1...DB0.0	Divisor (scale)	DIV	Divisor for value	Enum: 0: x/1 0...16777215 1: x/10 0...1677721.5 2: x/100 0...167772.15 3: x/1000 0...16777.215		

RORG	A5	**4BS Telegram**
FUNC	12	Automated Meter Reading (AMR)
TYPE	04	Temperature and Load Sensor

Submitter: SIMICS, NTT East

Description
Temp and Load Sensor aimed for fridge and other application.
E.g. milk carton puts on this sensor in fridge. The sensor sends a signal of temp and remaining amount of milk (in gram). Since this sensor is battery-powered, battery level information is transmitted with Temp and Load information, too.

Data exchange

Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: -
Trigger event: load changed
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: yes
Security level format: RLC + AES128

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	14	DB3.7...DB2.2	Meter reading	MR	Current value in gram	0...16383	0...16383	gram
14	2	DB2.1...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	-40...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	2	DB0.1...DB0.0	Battery Level	BL	Battery level	Enum: 0: 100-75% 1: 75-50% 2: 50-25% 3: 25-0%		

RORG	A5	4BS Telegram
FUNC	12	Automated Meter Reading (AMR)
TYPE	05	Temperature and Container Sensor

Submitter: SIMICS, NTT East

Description
Temp and Container Sensor aimed for fridge and other application.
E.g. eggs or egg carton puts on the Container Sensor in fridge. The sensor sends a signal of temp and remaining of eggs. Since this sensor is battery-powered, battery level information is transmitted with other information, too.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: -
Trigger event: load changed
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: yes
Security level format: RLC + AES128

Appendix
Location 0 - 9 are assigned as follows:

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	DB3.7	Position Sensor 0	PS0	Location 0	Enum: 0: not possessed 1: possessed		
1	1	DB3.6	Position Sensor 1	PS1	Location 1	Enum: 0: not possessed 1: possessed		
2	1	DB3.5	Position Sensor 2	PS2	Location 2	Enum: 0: not possessed 1: possessed		
3	1	DB3.4	Position Sensor 3	PS3	Location 3	Enum: 0: not possessed 1: possessed		
4	1	DB3.3	Position Sensor 4	PS4	Location 4	Enum: 0: not possessed 1: possessed		
5	1	DB3.2	Position Sensor 5	PS5	Location 5	Enum: 0: not possessed 1: possessed		
6	1	DB3.1	Position Sensor 6	PS6	Location 6	Enum: 0: not possessed 1: possessed		
7	1	DB3.0	Position Sensor 7	PS7	Location 7	Enum: 0: not possessed 1: possessed		
8	1	DB2.7	Position Sensor 8	PS8	Location 8	Enum: 0: not possessed 1: possessed		
9	1	DB2.6	Position Sensor 9	PS9	Location 9	Enum: 0: not possessed 1: possessed		
10	6	DB2.5...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	-40...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	2	DB0.1...DB0.0	Battery Level	BL	Battery level	Enum: 0: 100-75% 1: 75-50% 2: 50-25% 3: 25-0%		

RORG	A5	4BS Telegram
FUNC	12	Automated Meter Reading (AMR)

TYPE	10	Current meter 16 channels

Submitter: Ewattch

Description
This profile is used for up to 16 channels current meters.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: can be defined by user
Trigger event: 10 or 20 % delta for observed value
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: no
Security level format: -

Recommendation
Channels not used should not be transmitted.

Appendix
Our new product is a 12 channels current meter. It is able to measure, using a maximum of 12 current transformers, the current (mA) or cumulative current (mAh) of all of his channels. It is however not sending data for not configured channels (e.g. channels 12 to 15). The meter is sending values every 5 or 10 seconds, and in order to improve accuracy, a current fluctuation of more than 10 or 20 % will trigger a new transmission of the corresponding channel.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	24	DB3.7...DB1.0	Meter reading	MR	Current value in mA or cumulative value in A.h	0...16777215	according to **DIV**	according to **DT**
24	4	DB0.7...DB0.4	Measurement channel	CH	Channel no.	0...15	0...15	
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Data type (unit)	DT	Current value or cumulative value	Enum: 0: Cumulative value A.h ... 1: Current value mA ...		
30	2	DB0.1...DB0.0	Divisor (scale)	DIV	Divisor for value	Enum: 0: x/1 0...16777215 1: x/10 0...1677721.5		

						2: x/100 0...167772.15 3: x/1000 0...16777.215

A5-13: Environmental Applications

RORG	A5	**4BS Telegram**
FUNC	13	Environmental Applications
TYPE	01	Weather Station

A receiver that accepts EEP A5-13-01 at teach-in automatically needs to accept telegrams from the same ID that comply to the definitions of EEP A5-13-02 thru EEP A5-13-06. Different telegrams received from that ID need to be distinguished by their 4 bit identifiers.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Dawn sensor	DWS	Dawn sensor	0...255	0...999	lx
8	8	DB2.7...DB2.0	Temperature	TMP	Outdoor Temp	0...255	-40...+80	°C
16	8	DB1.7...DB1.0	Wind speed	WND	Wind speed	0...255	0...70	m/s
24	4	DB0.7...DB0.4	Identifier	ID	Identifier	Enum: 0x1:		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Day / Night	D/N	Day / Night	Enum: 0: Day 1: Night		
30	1	DB0.1	Rain Indication	RAN	Rain Indication	Enum: 0: No Rain 1: Rain		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	13	Environmental Applications
TYPE	02	Sun Intensity

Submitter: Elsner electronics

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Sun – West	SNW	Sun - West,linear	0...255	0...150	klx
8	8	DB2.7...DB2.0	Sun – South	SNS	Sun - South,linear	0...255	0...150	klx
16	8	DB1.7...DB1.0	Sun – East	SNE	Sun - East,linear	0...255	0...150	klx
24	4	DB0.7...DB0.4	Identifier	ID	Identifier	Enum: 0x2:		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Hemisphere	HEM	0 = north / 1 = south, then swith Sun south to Sun North when in southern hemisphere	Enum: 0: North 1: South		
30	2	DB0.1...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	13	Environmental Applications
TYPE	03	Date Exchange

Submitter: Elsner electronics

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB3.7...DB3.5	Not Used (= 0)					
3	5	DB3.4...DB3.0	Day	DY	Day	1...31	1...31	N/A
8	4	DB2.7...DB2.4	Not Used (= 0)					
12	4	DB2.3...DB2.0	Month	MTH	Month (1->January)	1...12	1...12	N/A
16	1	DB1.7	Not Used (= 0)					
17	7	DB1.6...DB1.0	Year	YR	Year (0->Year 2000)	0...99	2000...2099	N/A
24	4	DB0.7...DB0.4	Identifier	ID	Identifier	Enum: 0x3:		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Source	SRC	Source	Enum: 0: Real Time Clock 1: GPS or equivalent (e.g. DCF77, WWV)		

RORG	A5	4BS Telegram
FUNC	13	Environmental Applications
TYPE	04	Time and Day Exchange

Submitter: Elsner electronics

Recommendation: always transmit time in 24 hrs format

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB3.7...DB3.5	Weekday	WDY	Weekday (1 -> Monday)	Enum: 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday		
3	5	DB3.4...DB3.0	Hour	HR	Hour	0...23	0...23	N/A
8	2	DB2.7...DB2.6	Not Used (= 0)					
10	6	DB2.5...DB2.0	Minute	MIN	Minute	0...59	0...59	N/A
16	2	DB1.7...DB1.6	Not Used (= 0)					
18	6	DB1.5...DB1.0	Second	SEC	Second	0...59	0...59	N/A
24	4	DB0.7...DB0.4	Identifier	ID	Identifier	Enum: 0x4:		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Time Format	TMF	Time Format	Enum: 0: 24 hours 1: 12 hours		
30	1	DB0.1	AM/PM	A/PM	AM or PM	Enum: 0: AM 1: PM		

31	1	DB0.0	Source	SRC	Source	Enum: 0: Real Time Clock 1: GPS or equivalent (e.g. DCF77, WWV)

RORG	A5	**4BS Telegram**
FUNC	13	Environmental Applications
TYPE	05	Direction Exchange

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Elevation	ELV	Elevation (0° -> horizon)	0...180	-90...+90	°
8	7	DB2.7...DB2.1	Not Used (= 0)					
15	9	DB2.0...DB1.0	Azimut	AZM	Azimuth (0° -> True north; clockwise)	0...359	0...359	°
24	4	DB0.7...DB0.4	Identifier	ID	Identifier	Enum: 0x5:		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	13	Environmental Applications
TYPE	06	Geographic Position Exchange

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	DB3.7...DB3.4	Latitude(MSB)	LAT(MSB)	Latitude MSB	according to **LAT(LSB)**	according to **LAT(LSB)**	according to **LAT(LSB)**
4	4	DB3.3...DB3.0	Longitude(MSB)	LOT(MSB)	Longitude MSB	according to **LOT(LSB)**	according to **LOT(LSB)**	according to **LOT(LSB)**
8	8	DB2.7...DB2.0	Latitude(LSB)	LAT(LSB)	Latitude LSB	0...4095	-90...+90	°
16	8	DB1.7...DB1.0	Longitude(LSB)	LOT(LSB)	Longitude LSB	0...4095	-180...+180	°
24	4	DB0.7...DB0.4	Identifier	ID	Identifier	Enum: 0x6:		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	13	Environmental Applications
TYPE	07	Wind Sensor

Submitter: Hideki Electronics Limited

Description
This profile provides wind sensor information.
That includes the current wind direction, the average and the maximum wind speed.

Data exchange
Direction: unidirectional

Addressing: broadcast
Communication trigger: time-triggered
Communication interval: 33 seconds
Trigger event: timer
Tx delay: N/A
Rx timeout: N/A

Teach-in
Teach-in method: 4BS teach-in 1

Security
Encryption supported: no
Security level format: N/A

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	DB3.7...DB3.4	Not Used (= 0)					
4	4	DB3.3...DB3.0	Wind Direction	WD	Shows the current wind direction	Enum: 0: NNE 1: NE 2: ENE 3: E 4: ESE 5: SE 6: SSE 7: S 8: SSW 9: SW 10: WSW 11: W 12: WNW 13: NW 14: NNW 15: N		
8	8	DB2.7...DB2.0	Average Wind Speed	AWS	Linear average wind speed	0...255	1...199.9	mph
16	8	DB1.7...DB1.0	Maximum Wind Speed	MWS	Maximum wind speed	0...255	1...199.9	mph
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Battery Status	BS	Indicates if the battery is low	Enum: 0: Battery okay 1: Battery low		

RORG	A5	4BS Telegram
FUNC	13	Environmental Applications
TYPE	08	Rain Sensor

Submitter: Hideki Electronics Limited

Description
This profile provides rain sensor information.
That includes the current rainfall count value and the rainfall count correction.
Using these values, the receiver of the information can calculate the currently measured amount of rainfall.

Rainfall = (Rainfall Count x 0.6875 mm) x (1+ (Rainfall Adjust Sign) Rainfall Adjust)

Example:
Rainfall Count = 10
Rainfall Adjust = 26

Rainfall Adjust Sign = 1
Rainfall = 10 x 0.6875 mm X (1 + 2.6/100) = 7.05375 mm

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: time-triggered
Communication interval: 183 seconds
Trigger event: timer
Tx delay: N/A
Rx timeout: N/A

Teach-in
Teach-in method: 4BS teach-in 1

Security
Encryption supported: no
Security level format: N/A

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	DB3.7	Not Used (= 0)					
1	1	DB3.6	Rainfall Adjust Sign	RAS	Provides the sign of the rainfall adjust value	Enum: 0: Negative 1: Positive		
2	6	DB3.5...DB3.0	Rainfall Adjust	RFA	Provides the rainfall count correction value	Enum: 0...39: 0...3.9 % Reserved 40...63:		
8	16	DB2.7...DB1.0	Rainfall Count	RFC	Number of counted rain drops	0...65535	0...65535	
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Battery Status	BS	Indicates if the battery is low	Enum: 0: Battery okay 1: Battery low		

RORG	A5	4BS Telegram
FUNC	13	Environmental Applications
TYPE	10	Sun position and radiation

Submitter: NanoSense

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	7	DB3.7...DB3.1	Sun Elevation	SNE	Sun Elevation (linear); 91 - 127: reserved	0...90	0...90	°
7	1	DB3.0	Day / Night	D/N	Day / Night	Enum: 0: Day 1: Night		
8	8	DB2.7...DB2.0	Sun Azimuth	SNA	Sun Azimuth 181 - 255: reserved	0...180	-90...+90	°
16	8	DB1.7...DB1.0	Solar Radiation (MSB)	SRA (MSB)	Solar Radiation (MSB)	according to **SRA (LSB)**	according to **SRA (LSB)**	according to **SRA (LSB)**
24	4	DB0.7...DB0.4	Identifier	ID	Identifier	Enum: 0x7:		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		

29	3	DB0.2...DB0.0	Solar Radiation (LSB)	SRA (LSB)	Solar Radiation (LSB) (Linear); 2001..2048: reserved	0...2000	0...2000	W/m2

A5-14: Multi-Func Sensor

RORG	A5	**4BS Telegram**
FUNC	14	Multi-Func Sensor
TYPE	01	Single Input Contact (Window/Door), Supply voltage monitor

Submitter: Lutuo Technology

Purpose (eg): Ventilation, Lighting, Alarm

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	20	DB2.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Contact	CT		Enum: 0b0: Contact closed 0b1: Contact open		

RORG	A5	**4BS Telegram**
FUNC	14	Multi-Func Sensor
TYPE	02	Single Input Contact (Window/Door), Supply voltage monitor and Illumination

Submitter: Lutuo Technology

Purpose (eg): Ventilation, Lighting, Alarm

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	8	DB2.7...DB2.0	Illumination	ILL	Illumination (linear); 251 – over range, 252 - 255 reserved	0...250	0...1000	lx
16	12	DB1.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Contact	CT		Enum: 0b0: Contact closed 0b1: Contact open		

RORG	A5	4BS Telegram
FUNC	14	Multi-Func Sensor
TYPE	03	Single Input Contact (Window/Door), Supply voltage monitor and Vibration

Submitter: Lutuo Technology

Purpose (eg): Ventilation, Lighting, Alarm , Intrusion (breakage of glass), Calling system

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	20	DB2.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Vibration	VIB		Enum: 0b0: No vibration detected 0b1: Vibration detected		
31	1	DB0.0	Contact	CT		Enum: 0b0: Contact closed 0b1: Contact open		

RORG	A5	4BS Telegram
FUNC	14	Multi-Func Sensor
TYPE	04	Single Input Contact (Window/Door), Supply voltage monitor, Vibration and Illumination

Submitter: Lutuo Technology

Purpose (eg): Ventilation, Lighting, Alarm , Intrusion (breakage of glass), Calling system

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	8	DB2.7...DB2.0	Illumination	ILL	Illumination (linear); 251 – over range, 252 - 255 reserved	0...250	0...1000	lx
16	12	DB1.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Vibration	VIB		Enum: 0b0: No vibration detected 0b1: Vibration detected		
31	1	DB0.0	Contact	CT		Enum: 0b0: Contact closed 0b1: Contact open		

RORG	A5	4BS Telegram
FUNC	14	Multi-Func Sensor
TYPE	05	Vibration/Tilt, Supply voltage monitor

Submitter: Lutuo Technology

Purpose (eg): Intrusion (breakage of glass), Calling system

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	20	DB2.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Vibration	VIB		Enum: 0b0: No vibration detected 0b1: Vibration detected		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	14	Multi-Func Sensor
TYPE	06	Vibration/Tilt, Illumination and Supply voltage monitor

Submitter: Lutuo Technology

Purpose (eg): Intrusion (breakage of glass), Calling system

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear); 251 – 255 reserved for error code	0...250	0...5.0	V
8	8	DB2.7...DB2.0	Illumination	ILL	Illumination (linear); 251 – over range, 252 - 255 reserved	0...250	0...1000	lx
16	12	DB1.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Not Used (= 0)					
30	1	DB0.1	Vibration	VIB		Enum: 0b0: No vibration detected 0b1: Vibration detected		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	14	Multi-Func Sensor
TYPE	07	Dual-door-contact with States Open/Closed and Locked/Unlocked, Supply voltage monitor

Submitter: EiMSIG eine Marke der EFP GmbH

Description
Door-sensor with the door-states open/closed and sensor for the door-lock with states locked/unlocked.
Additional supply-voltage-monitor.

Data exchange
Direction: unidirectional
Addressing: broadcast

Communication trigger: event- & time-triggered
Communication interval: N/A
Trigger event: timer and change on state
Tx delay: N/A
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in

Security
Encryption supported: yes
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage (linear)	0...250	0...5.0	V
8	20	DB2.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Door Contact	DCT		Enum: 0b0: Door Closed 0b1: Door Open		
30	1	DB0.1	Lock Contact	LCT		Enum: 0b0: Door Locked 0b1: Door Unlocked		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	14	Multi-Func Sensor
TYPE	08	Dual-door-contact with States Open/Closed and Locked/Unlocked, Supply voltage monitor and Vibration detection

Submitter: EiMSIG eine Marke der EFP GmbH

Description
Door-sensor with the door-states open/closed and sensor for the door-lock with states locked/unlocked.
Additional supply-voltage-monitor and vibration-sensor for glass-breakage detection.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: N/A
Trigger event: timer and change on state
Tx delay: N/A
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in

Security
Encryption supported: yes
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear)	0...250	0...5.0	V
8	20	DB2.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Door Contact	DCT		Enum: 0b0: Door Closed 0b1: Door Open		

30	1	DB0.1	Lock Contact	LCT		Enum: 0b0: Door Locked 0b1: Door Unlocked
31	1	DB0.0	Vibration	VIB		Enum: 0b0: No vibration detected 0b1: Vibration detected

RORG	A5	**4BS Telegram**
FUNC	14	Multi-Func Sensor
TYPE	09	Window/Door-Sensor with States Open/Closed/Tilt, Supply voltage monitor

Submitter: EiMSIG eine Marke der EFP GmbH

Description
Door/window-sensor with states open/closed/tilt and supply-voltage-monitor.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: N/A
Trigger event: timer and change on state
Tx delay: N/A
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in

Security
Encryption supported: yes
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear)	0...250	0...5.0	V
8	20	DB2.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Contact	CT		Enum: 0b00: Closed 0b01: Tilt 0b10: Reserved 0b11: Open		
31	1	DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	14	Multi-Func Sensor
TYPE	0A	Window/Door-Sensor with States Open/Closed/Tilt, Supply voltage monitor and Vibration detection

Submitter: EiMSIG eine Marke der EFP GmbH

Description
Door/window-sensor with states open/closed/tilt.
Additional vibration-sensor for the detection of glass-breakage and supply voltage monitor.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: N/A

Trigger event: timer and change on state
Tx delay: N/A
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in

Security
Encryption supported: yes
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Supply voltage	SVC	Supply voltage / super cap. (linear)	0...250	0...5.0	V
8	20	DB2.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Contact	CT		Enum: 0b00: Closed 0b01: Tilt 0b10: Reserved 0b11: Open		
31	1	DB0.0	Vibration	VIB		Enum: 0b0: No vibration detected 0b1: Vibration detected		

A5-20: HVAC Components

RORG	A5	4BS Telegram
FUNC	20	HVAC Components
TYPE	01	Battery Powered Actuator (BI-DIR)

Submitter: Kieback + Peter GmbH

DIRECTION-1 = Transmit mode: Message from the actuator to the controller
DIRECTION-2 = Receive mode: Commands from the controller to the actuator; max. reponse time 1 sec.

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Current Value	CV	Current value	0...100	0...100	%
8	1	DB2.7	Service On	SO	Service On	Enum: 1: on		
9	1	DB2.6	Energy input enabled	ENIE	Energy input enabled	Enum: 1: true		
10	1	DB2.5	Energy Storage	ES	Energy storage sufficiently charged	Enum: 1: true		
11	1	DB2.4	Battery capacity	BCAP	Battery capacity; change battery next days	Enum: 0: true		
12	1	DB2.3	Contact, cover open	CCO	Contact, cover open	Enum: 1: true		
13	1	DB2.2	Failure temperature sensor, out off range	FTS	Failure Temperature sensor, out off range	Enum: 1: true		
14	1	DB2.1	Detection, window open	DWO	Detection, window open	Enum: 1: true		
15	1	DB2.0	Actuator obstructed	ACO	Actuator obstructed	Enum: 1: true		

16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Valve position or Temperature Setpoint	SP	Valve position or Temperature set point (linear); selection with DB1.2 Valve position 0…100% in combination with compatible classic controllers the actuator used DB_3; Temperature set point: The actuator can be used as self-sufficient room controller (pi controller) without integration in automation systems. Wherever the user wants room conditions to be individually controlled, the actuator can work in combination with a wireless room device (RCU).	0...100 or 255	0...100 or +40	% or °C
8	8	DB2.7...DB2.0	Temperature from RCU	TMP	Temperature actual from RCU = 0b0 (Room controller-unit), see DB1.0 Maintenance mode ('service on'): DB_2.BIT_5: energy memory sufficiently charged =1 DB_2.BIT_4: battery capacity changing battery in the next days, need changing batteries = 0 Status feedback signal (service on, DB_2.BIT_7	255...0	0...+40	°C
16	1	DB1.7	Run init sequence	RIN	The limit switching measures the travel and signals when an end position has been reached. This end position (valve zero point) in the actuator is stored.	Enum: 1: true		
17	1	DB1.6	Lift set	LFS	Initialization, adjustment to the valve stroke. The Initialization is switched after receiving the command. The valve is completely opened and closed during initialization.	Enum: 1: true		
18	1	DB1.5	Valve open / maintenance	VO	After receiving an operation command, the actuator moves the valve in direction open or close. when reaching the end position, an automatic switch-off procedure is started. In service mode the valve can be set to open or closed always.	Enum: 1: true		
19	1	DB1.4	Valve closed	VC	valve closed	Enum: 1: true		
20	1	DB1.3	Summer bit, Reduction of energy consumption	SB	The radio communication between the actuator and the controller is restricted, sleep mode is extended. This functionality can be used for battery powered actuators.	Enum: 1: true		
21	1	DB1.2	Set Point Selection	SPS	Set Point Selection for DB3	Enum: 0: Valve position (0-100%). Unit respond to		

						controller. 1: Temperature set point 0...40°C. Unit respond to room sensor and use internal PI loop.
22	1	DB1.1	Set point inverse	SPN	Valve set point can be sent to the actuator normal or inverted. The selection is done by DB_1.Bit1. The implementation is done and is controlled in the actuator with DB_3. This function is used in dependence on the type of valve.	Enum: 1: true
23	1	DB1.0	Select function	RCU	RCU or 'Service on': After transmitting the command to the actuator, it can be send from the controller or a service device, the actuator sends a status feedback signal (service on, DB_2.BIT_7).	Enum: 0: RCU 1: service on
24	4	DB0.7...DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	3	DB0.2...DB0.0	Not Used (= 0)			

RORG	A5	**4BS Telegram**
FUNC	20	HVAC Components
TYPE	02	Basic Actuator (BI-DIR)

Submitter: Spartan Peripheral Devices

Basic Actuator can be used by any manufacturer for linear or rotary actuator.

DIRECTION-1 = Transmit mode: Message from the actuator to the controller.
DIRECTION-2 = Receive mode: Commands from the controller to the actuator. To use with a BAS/Gateway system; max. reponse time 1 sec.

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Actual Value	AV	Actual value (linear); can be a linear or rotation motion.	0...100	0...100	%
8	14	DB2.7...DB1.2	Not Used (= 0)					
22	1	DB1.1	Set point inverse	SPI	Set point inverse (Needs to be defined by manufacturer what zero(0) is equal to, and one(1) is equal to. Default state to be define as per product manufacturer	Enum: 1: true		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Valve Set point	VSP	Valve set Point (linear)	0...100	0...100	%
8	8	DB2.7...DB2.0	Not Used (= 0)					

16	6	DB1.7...DB1.2	Not Used (= 0)			
22	1	DB1.1	Set point inverse	VSP	'Set point inverse' needs to be defined by manufacturer what zero(0) is equal to, and one(1) is equal to. Default state to be define as per product manufacturer. It can send a command to invert functionality of the unit. In some instance some equipment might need 100% to represent fully extracted, in other fully retracted.	Enum: 1: true
23	5	DB1.0...DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	3	DB0.2...DB0.0	Not Used (= 0)			

RORG	A5	**4BS Telegram**
FUNC	20	HVAC Components
TYPE	03	Line powered Actuator (BI-DIR)

Submitter: Spartan Peripheral Devices

DIRECTION-1 = Transmit mode: Message from the actuator to the controller.
DIRECTION-2 = Receive mode: Commands from the controller to the actuator; max. reponse time 1 sec.

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Actual valve	AV	Actual valve	0...100	0...100	%
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Temperature	TMP	Temperature (linear)	0...255	0...+40	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Actuator or Temperature Setpoint	ATS	Actuator Setpoint: in combination with BAS/Gateway controllers. Temperature Setpoint: The actuator can be used as self-sufficient room controller (pi controller) without integration in automation systems. Wherever the user wants room conditions to be individually controlled, the actuator can work in combination with a wireless room device (RCU).	0...100 or 255	0...100 or +40	% or °C
8	8	DB2.7...DB2.0	Temperature from RCU	TMPRC	Temperature actual from RCU = 0b0 (Room controller-unit)	255...0	0...+40	°C
16	5	DB1.7...DB1.3	Not Used (= 0)					
21	1	DB1.2	Set Point Selection	SPS	Set Point Selection for DB3	Enum: 0: Actuator Setpoint (0-100%); Unit respond to controller. 1: Temperature Setpoint 0...+40°C; Unit respond to room		

						sensor and use internal PI loop.
22	1	DB1.1	Set Point Inverse		Valve set point can be sent to the actuator normal or inverted through BAS/Gateway controller. The selection is done by DB_1.Bit1. in the actuator with DB_3. This function is used in dependence on the type of valve.	Enum: 1: true
23	5	DB1.0...DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	3	DB0.2...DB0.0	Not Used (= 0)			

RORG	A5	**4BS Telegram**
FUNC	20	HVAC Components
TYPE	04	Heating Radiator Valve Actuating Drive with Feed and Room Temperature Measurement, Local Set Point Control and Display (BI-DIR)

Submitter: Holter Regelarmaturen GmbH & Co. KG

Description
The following document describes the communication between a controller and an intelligent heating radiator valve actuating drive with the following features:

- Feed temperature measurement
- Room temperature measurement
- Current position feedback
- Display
- Button
- On device temperature set point selection

In order to be able to process this information and control the actuator, every command has been included in this document. Each customer can use his own controller by implementing the EEP of this document.

Data exchange
Direction: bidirectional
Addressing: unicast (ADT)
Communication trigger: event- & time-triggered
Communication interval: can be configured by the controller
Trigger event: a trigger event occurs when the button is pressed or the local set point is used
Tx delay: 550 ms is the maximum response time for Smart-Ack Devices and 1100 ms for devices which use the 4BS teach-in method
Rx timeout: just 1 message per wake-up cycle

Teach-in
Teach-in method: Smart-Ack teach-in and 4BS teach-in Variation 3

Security
Encryption supported: no
Security level format: -

Telegram Description of Direction 1 (Transmit mode / Message from the actuator to the controller)

This direction initializes the communication, shares the needed data and waits for an answer from the controller. This allows the device to work in deep sleep mode the rest of the time.

Each message from the actuator contains the following information:

- Current Position (CP)
  The current position is a feedback value from the actuator. It indicates the actual per cent position of the valve. The value 0 % means that the valve is completely closed and 100 % completely open. The controller can use this information for the room temperature regulation.

- Temperature Set Point OR Feed Temperature (FTS)*
  * This byte is shared by the Temperature Set Point and the Feed Temperature value. Only one of these values is sent in the same message. Which value is transmitted is indicated by DB0.1 (TS bit).
  The feed temperature is the water temperature in the radiator input, which can be useful for implementing

several features in the home automation system.
The temperature set point is only sent when the user specifies a new room temperature by using the local temperature set point on the device.

- Room Temperature (TMP) OR Failure Code (FC)*
  * This byte is shared by the Room Temperature and Failure Code Value. Only one of these values is sent in the same message. The value transmitted is indicated by DB0.0 (FL). By default it is the room temperature.
  The room temperature is the ambient temperature of the place in which the device is used and is measured by the actuator. This value is transmitted if no error occurred.
  The Failure Code is transmitted instead of the Room Temperature if an error occurs.

- Measurement Status (MST)
  The temperature measurements (room and feed temperature) can be deactivated in order to reduce the energy consumption. This can be specified only by the controller i.e. to implement summer mode or to replace the internal room temperature measurement of the actuator by an external one.

- Status Request (SRT)
  The status request bit can be used to ask the controller about its status. If the controller does not send back the correct reply, the actuator will start its own room temperature regulation. With this feature, a frozen actuator would not interrupt the room temperature regulation.

- Teach-in Bit (LRNB)
  For establishing the radio link between the controller and the actuator, a teachin message has to be sent from the actuator to the controller. If the binary value 0 is transmitted, the message will be identified as a teach-in one and will allow the controller to receive the EnOcean-ID of the actuator.

- Button Lock Status (BLS)
  The button lock status can be set by the controller. This enables or disables the manual room temperature selection. If locked, the manual room temperature selection on the actuator will be disabled and the user will be notified with a symbol on the display.

- Temperature Selection (TS)
  If the user specifies a temperature set point manually on the device, this will be sent to the controller and indicated on the temperature selection field (TS). It can indicate that the field FTS contains the temperature set point (binary value = 1) or the feed temperature (binary value = 0).

- Failure (FL)
  Indicates the occurrence of a failure. The room temperature value is replaced by the failure code if the bit FL has the binary value 1.

Telegram Description of Direction 2 (Receive mode / Commands from the controller to the actuator)

The messages from the controller to the actuator are sent in this direction. A message in this direction has to be sent after receiving a message from the actuator, in order to achieve a successful communication. If the controller message is not received by the actuator in a specific time after a direction 1 message, no information will be received by the actuator. The time that the actuator will wait for a reply is defined by the Smart-Ack Teach-In process. For controllers which cannot use Smart-Ack, the 4BS Teach-in Variation 3 has to be used, with a maximum response time of 1100 ms.

Each message from the controller contains the following information:

- Valve Position (POS)
  The valve position is a set point position for the valve. It indicates the per cent position of the valve, which the actuator has to reach. The value 0 % means that the valve is completely closed and 100 % completely open. The controller should be able to regulate the room temperature by adjusting this value.

- Temperature Set Point (TSP)
  The controller can send the temperature set point to the actuator in order to allow the user to see the actual specified temperature in the device display. This value does not affect room temperature regulation.

- Measurement Control (MC)
  The temperature measurements (room and feed temperature) can be deactivated in order to reduce energy consumption. This can be specified only by the controller i.e. to implement summer mode or to replace the internal room temperature measurement by the device with an external one. The measurement control bit enables the controller to activate or deactivate the measurements.

- Wake-up Cycle (WUC)
  To save energy, the actuator works in deep sleep mode the most of the time. Nevertheless it has to wake up to communicate with the controller and to reach the valve position specified by the controller. The longer the actuator remains in deep sleep mode, the more energy efficient will be your batteries. If fast response is required, the actuator has to communicate more frequently with the controller and that is why it should use a shorter wake-up cycle. If a fast room temperature control is not required, the wake-up cycle should be set by the controller as long as possible.

- Display Orientation (DSO)
  The heater valves can be installed in different directions. That is why it can be useful to have the option to choose the fitting display orientation. This feature makes reading the display easier.

- Teach-in Bit (LRNB)
  For establishing a radio link between the controller and the actuator, a teach-in telegram has to be sent from the controller to the actuator. If the binary value 0 is transmitted, the message will be identified as a teach-in one and will allow the device to receive the EnOcean-ID from the controller.

- Button Lock Control (BLS)
  The button lock status can be set by the controller. This enables or disables the manual room temperature selection. If locked, the manual room temperature selection on the actuator will be disabled and the user will be notified with a symbol on the display.

- Service Command (SER)
  In order to adapt the actuator to a new valve, the controller can order the execution of some functions of the actuator:
  - run initialisation: This function has to be executed for adapting the actuator to the length of the valve stroke.
  - open valve: To facilitate the installation or maintenance of the valve, the actuator can open the valve completely. After completely opening the valve it is necessary to run the initialisation.
  - close valve: Completely close the valve.

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Current Position	CP	Current valve position	0...100	0...100	%
8	8	DB2.7...DB2.0	Feed Temperature OR Temperature Set Point	FTS	Either current feed temperature value or temperature set point (defined by DB0.1)	0...255	20 ... 80 or 10 ... 30	°C
16	8	DB1.7...DB1.0	Room Temperature OR Failure Code	TMPFC	Current room temperature value (10...30°C) OR Failure Code (Enum)	Enum: 0...255: 10...30 °C 00 ... 16: Reserved 17: Measurement error 18: Battery empty 19: Reserved 20: Frost protection 21 ... 32: Reserved 33: Blocked valve 34 ... 35: Reserved 36: End point detection error 37 ... 39: Reserved 40: No valve 41 ... 48: Reserved 49: Not taught in 50 ... 52: Reserved 53: No response from controller 54: Teach-in error 55 ... 255: Reserved		
24	1	DB0.7	Measurement Status	MST	Shows if the temperature measurement (feed temperature and room temperature) is active	Enum: 0: Active 1: Inactive		
25	1	DB0.6	Status Request	STR	Request for status from the controller	Enum: 0: No change 1: Status requested		
26	2	DB0.5...DB0.4	Not Used (= 0)					

28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Button Lock Status	BLS	Shows if all buttons on the actuator are locked	Enum: 0: Unlocked 1: Locked
30	1	DB0.1	Temperature Selection	TS	Defines which temperature value is transmitted in DB2	Enum: 0: Feed temperature 1: Temperature set point
31	1	DB0.0	Failure	FL	A failure occurred, see DB1.7-DB1.0 for Failure Code	Enum: 0: No failure (TMP is transmitted) 1: failure (FC is transmitted)

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Valve Position	POS	Valve position	0...100	0...100	%
8	8	DB2.7...DB2.0	Temperature Set Point	TSP	Temperature set point	0...255	10...30	°C
16	1	DB1.7	Not Used (= 0)					
17	1	DB1.6	Measurement Control	MC	Control the temperature measurement (feed temperature + room temperature)	Enum: 0: Enable 1: Disable		
18	6	DB1.5...DB1.0	Wake-up Cycle	WUC	Defines the cyclic wake-up time	Enum: 0: 10 sec 1: 60 sec 2: 90 sec 3: 120 sec 4: 150 sec 5: 180 sec 6: 210 sec 7: 240 sec 8: 270 sec 9: 300 sec (5 min) 10: 330 sec 11: 360 sec 12: 390 sec 13: 420 sec 14: 450 sec 15: 480 sec 16: 510 sec 17: 540 sec 18: 570 sec 19: 600 sec (10 min)		

						20: 630 sec
						21: 660 sec
						22: 690 sec
						23: 720 sec
						24: 750 sec
						25: 780 sec
						26: 810 sec
						27: 840 sec
						28: 870 sec
						29: 900 sec (15 min)
						30: 930 sec
						31: 960 sec
						32: 990 sec
						33: 1020 sec
						34: 1050 sec
						35: 1080 sec
						36: 1110 sec
						37: 1140 sec
						38: 1170 sec
						39: 1200 sec (20 min)
						40: 1230 sec
						41: 1260 sec
						42: 1290 sec
						43: 1320 sec
						44: 1350 sec
						45: 1380 sec
						46: 1410 sec
						47: 1440 sec
						48: 1470 sec
						49: 1500 sec (25 min)
						50: 3 hrs
						51: 6 hrs
						52: 9 hrs
						53: 12 hrs

						54: 15 hrs 55: 18 hrs 56: 21 hrs 57: 24 hrs 58: 27 hrs 59: 30 hrs 60: 33 hrs 61: 36 hrs 62: 39 hrs 63: 42 hrs (max)
24	2	DB0.7...DB0.6	Not Used (= 0)			
26	2	DB0.5...DB0.4	Display Orientation	DSO	Adjusts the display orientation	Enum: 0: 0° 1: 90° 2: 180° 3: 270°
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Button Lock Control	BLC	Set the button lock status	Enum: 0: Unlocked 1: Locked
30	2	DB0.1...DB0.0	Service Command	SER	Initiates certain temporary service operations	Enum: 0: No change 1: Open valve 2: Run initialisation 3: Close valve

RORG	A5	**4BS Telegram**
FUNC	20	HVAC Components
TYPE	05	Ventilation Unit (BI-DIR)

Submitter: Itho Daalderop

Description
The device represented by this EEP is a stand-alone ventilation unit.

Smart-Ack is not supported/required.

The ventilation unit itself does not send messages on a regular (time or event triggered) base but will always send a response message after it receives a message from e.g. a remote control or gateway.

When the controller only wants to know the status of the ventilation unit and does not want to change the ventilation setting this can be requested by sending a message from controller to the fan unit with new fan speed setting NSP = 7 = “no change”.

When more than one controller is connected to the unit the last received speed setting will be the new speed setting.

When a ventilation unit supports auto speed this means that the speed is influenced / calculated by sensor values which are directly connected to the ventilation unit (e.g. CO2 or RH sensors).

How the timer setting for a new fan speed (NSPT) is handled by the ventilation unit is depending on the unit and legislation.

When the timer period has expired the ventilation unit will go back to the previous or auto setting, this behavior is depending on the ventilation unit and legislation.

Data exchange
Direction: bidirectional
Addressing: addressed
Communication trigger: event-triggered
Communication interval: N/A
Trigger event: received message
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in variation 3 (bidirectional)

Security
Encryption supported: no
Security level format: -

Directions
DIRECTION-1 = Transmit mode: Message from ventilation unit to controller
DIRECTION-2 = Receive mode: Commands from controller to ventilation unit

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB3.7...DB3.5	Actual speed setting	ASP	Actual speed setting of ventilation unit	Enum: 0: Minimum speed / away 1: Speed 1 / low 2: Speed 2 / mid 3: Speed 3 / high 4: Max speed 5: Auto 6: Not used 7: Not used		
3	3	DB3.4...DB3.2	Actual speed timer setting	ASPT	Actual timer value for actual speed	Enum: 0: No timer set or expired 1: 1..10 min left 2: 11..20 min left 3: 21..30 min left 4: 31..40 min left 5: 41..50 min left 6: 51..60 min left 7: > 60 min left		
6	2	DB3.1...DB3.0	Not Used (= 0)					
8	3	DB2.7...DB2.5	Not Used (= 0)					
11	1	DB2.4	Node low battery	E-NBAT	External node low battery error	Enum: 0: No error 1: Error		

12	1	DB2.3	Node comm. error	E-NCOM	External node communication error	Enum: 0: No error 1: Error
13	1	DB2.2	Sensor error	E-SENS	Internal sensor error	Enum: 0: No error 1: Error
14	1	DB2.1	Fan speed error	E-FSPD	Desired fan speed not reached error	Enum: 0: No error 1: Error
15	1	DB2.0	Error	ERR	Unit has an error	Enum: 0: No error 1: Error
16	8	DB1.7...DB1.0	Filter condition	FLTR	Indication of the air filter's condition	Enum: 0: Filter needs replacement 1...100: % dirty..clean filter 101...254: Not used 255: No filter present
24	1	DB0.7	Auto speed supported	AUTO	Ventilation unit supports auto speed or not	Enum: 0: Auto speed not supported 1: Auto speed supported
25	1	DB0.6	By-pass active	BPASS	Summer bypass active or not	Enum: 0: Summer bypass not active 1: Summer bypass active
26	1	DB0.5	Frost protection	FROST	Frost protection active or not	Enum: 0: Frost protection not active 1: Frost protection active
27	1	DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	3	DB0.2...DB0.0	Not Used (= 0)			

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	DB3.7...DB3.5	New speed setting	NSP	New speed setting for ventilation unit	Enum: 0: Minimum speed / away 1: Speed 1 / low 2: Speed 2 / mid 3: Speed 3 / high 4: Max speed 5: Auto 6: Not used 7: No change		
3	5	DB3.4...DB3.0	New speed timer setting	NSPT	Timer setting for new speed	Enum: 0: No timer / no change		

						1...6: 10..60 min 7...29: 2..24 hrs 30...31: Not used
8	8	DB2.7...DB2.0	Not Used (= 0)			
16	8	DB1.7...DB1.0	Not Used (= 0)			
24	1	DB0.7	Reset error	RSTE	Reset the unit when error present	Enum: 0: Don't reset error 1: Reset error
25	1	DB0.6	Reset filter timer	RSTF	Reset the filter timer	Enum: 0: Don't reset filter timer 1: Reset filter timer Reset only possible when timer expired (FLTR=0)
26	2	DB0.5...DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	3	DB0.2...DB0.0	Not Used (= 0)			

RORG	A5	**4BS Telegram**
FUNC	20	HVAC Components
TYPE	10	Generic HVAC Interface (BI-DIR)

Submitter: Intesis Software SL

Functions: Mode, Vane Position, Fan Speed, Sensors and On/Off: With this EEP plus the already existing EEP A5-10-03 and A5-20-11 all the information of AC indoor unit can be sent and received allowing a much easier and complete control of these units.

DIRECTION-1 = Receive mode: Commands received by the HVAC interface.
DIRECTION-2 = Transmit mode: Commands sent by the HVAC interface.

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Mode	MD	The modes are the same as in KNX and LON allowing a more transparent integration with this protocols and it has plenty of free positions for future expansion	Enum: 0: Auto 1: Heat 2: Morning Warmup 3: Cool 4: Night Purge 5: Precool 6: Off 7: Test 8: Emergency Heat 9: Fan only 10: Free cool		

						11:	Ice	
						12:	Max heat	
						13:	Economic heat/cool	
						14:	Dehumidification (dry)	
						15:	Calibration	
						16:	Emergency cool	
						17:	Emergency steam	
						18:	max cool	
						19:	Hvc load	
						20:	no load	
						21...30:	reserved	
						31:	Auto Heat	
						32:	Auto Cool	
						33...254:	reserved	
						255:	N/A	
8	4	DB2.7...DB2.4	Vane position	VPS		Enum:		
						0:	Auto	
						1:	Horizontal	
						2:	Pos2	
						3:	Pos3	
						4:	Pos4	
						5:	Vertical	
						6:	Swing	
						7...10:	Reserved	
						11:	Vertical swing	
						12:	Horizontal swing	
						13:	Horizontal and vertical swing	
						14:	Stop swing	
						15:	N/A	
12	4	DB2.3...DB2.0	Fan Speed	FANSP	fan speed value goes from 1 to 14. 1 is the lowest fan speed allowed by the AC and from there it increments with the value of this variable. Typically AC units have up to 5-6 speeds. Any speed higher than the maximum the AC allows would set it to the higher speed. 0 is auto and 15 is N/A	Enum:		
						0:	Auto	
						1...14:	Up to 14 fan speeds being 1 the lowest	
						15:	N/A	
16	8	DB1.7...DB1.0	Control variable	CVAR	Control variable; value 255 = auto	0...100, 255	0...100	%
24	4	DB0.7...DB0.4	Not Used (= 0)					

28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	2	DB0.2...DB0.1	Room occupancy	RO	The interfaces can automatically control the behaviour of the AC without integration in automation systems when linked to presence/movement sensors.	Enum: 0: Occupied 1: StandBy (waiting to perform action) 2: Unoccupied (action performed) 3: Off (no occupancy and no action)
31	1	DB0.0	On/Off	O/I	On/Off	Enum: 0: off (the unit is not running) 1: on

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Mode	MD	The modes are the same as in KNX and LON allowing a more transparent integration with this protocols and it has plenty of free positions for future expansion	Enum: 0: Auto 1: Heat 2: Morning Warmup 3: Cool 4: Night Purge 5: Precool 6: Off 7: Test 8: Emergency Heat 9: Fan only 10: Free cool 11: Ice 12: Max heat 13: Economic heat/cool 14: Dehumidification (dry) 15: Calibration 16: Emergency cool 17: Emergency steam 18: max cool 19: Hvc load 20: no load 21...30: reserved 31: Auto Heat		

						32: Auto Cool reserved 33...254: 255: N/A		
8	4	DB2.7...DB2.4	Vane position	VPS		Enum: 0: Auto 1: Horizontal 2: Pos2 3: Pos3 4: Pos4 5: Vertical 6: Swing Reserved 7...10: 11: Vertical swing 12: Horizontal swing 13: Horizontal and vertical swing 14: Stop swing 15: N/A		
12	4	DB2.3...DB2.0	Fan Speed	FANSP	fan speed value goes from 1 to 14. 1 is the lowest fan speed allowed by the AC and from there it increments with the value of this variable. Typically AC units have up to 5-6 speeds. Any speed higher than the maximum the AC allows would set it to the higher speed. 0 is auto and 15 is N/A	Enum: 0: Auto 1...14: Up to 14 fan speeds being 1 the lowest 15: N/A		
16	8	DB1.7...DB1.0	Control variable	CVAR	Control variable (linear); value 255 = auto	0...100, 255	0...100	%
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Room occupancy	RO	Room occupancy	Enum: 0: Occupied 1: StandBy (waiting to perform action) 2: Unoccupied (action performed) 3: Off (no occupancy and no action)		
31	1	DB0.0	On/Off	O/I	On/Off	Enum: 0: off 1: on		

RORG	A5	**4BS Telegram**
FUNC	20	HVAC Components
TYPE	11	Generic HVAC Interface – Error Control (BI-DIR)

Submitter: Intesis Software SL

Error Control: AC Error Code, Error States and Disablements. With this EEP plus the already existing EEP A5-10-03 and A5-20-10 all the information of AC indoor unit can be sent and received allowing a much easier and complete control of these units.

DIRECTION-1 = Receive mode: Commands received by the HVAC interface.
DIRECTION-2 = Transmit mode: Commands sent by the HVAC interface.

DIRECTION-1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	23	DB3.7...DB1.1	Not Used (= 0)					
23	1	DB1.0	External disablement	EXDS	External disablement	Enum: 0: Not disabled 1: Disabled		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Disable remote controller	DRC	Disable remote controller (When in receive mode it controls if the interface overwrites the remote controller commands.)	Enum: 0: Enable Remote controller 1: Disable Remote controller		
30	1	DB0.1	Window contact	WC	Window contact	Enum: 0: Windows opened 1: Windows closed		
31	1	DB0.0	Not Used (= 0)					

DIRECTION-2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Error Code	ERR	Error Code (DB3 HI,DB2 LO); generated by A.C.	0...65535	0...65535	N/A
16	4	DB1.7...DB1.4	Reserved	RES	Reserved (0b0000)	Enum: : Reserved		
20	1	DB1.3	Other disablement	OD	Manufacturer defined. It is just to provide an extra "disablement signal" that could be used for other devices. People would not have to change anything then as this is already an established "signal"	Enum: 0: Not disabled 1: Disabled		
21	1	DB1.2	Window contact disablement	WCD	Window contact disablement	Enum: 0: Not disabled 1: Disabled		
22	1	DB1.1	Key card disablement	KCD	Key carddisablement	Enum: 0: Not disabled 1: Disabled		
23	1	DB1.0	External disablement	ED	External disablement	Enum: 0: Not disabled 1: Disabled		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		

29	1	DB0.2	Remote controller Disablement	RCD	Remote controller Disablement (In transmit it sends the status of this parameter. If the manufacturer doesn't support this option, it will send allways 0, no matter what it receives.)	Enum: 0: Remote controller enabled 1: Remote controller disabled
30	1	DB0.1	Window contact	WC	Window contact	Enum: 0: Windows opened 1: Windows closed
31	1	DB0.0	Alarm State	AS	Alarm State	Enum: 0: Ok 1: Error

RORG	A5	**4BS Telegram**
FUNC	20	HVAC Components
TYPE	12	Temperature Controller Input

Submitter: Thermokon Sensortechnik GmbH

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Control Variable override	CV	Actual value for controller	0...255	0...100	%
8	8	DB2.7...DB2.0	FanStage override	FANOR	FanStage override	Enum: 0: Stage 0 1: Stage 1 2: Stage 2 3: Stage 3 31: auto 255: not available		
16	8	DB1.7...DB1.0	Setpoint shift	SPS	Actual set point could be shifted	0...255	-10...+10	°K
24	1	DB0.7	Fan override	FANOR		Enum: 0: Automatic 1: Override Fan DB2		
25	2	DB0.6...DB0.5	Controller mode	CTM		Enum: 0: Auto mode 1: Heating 2: Cooling 3: Off		
27	1	DB0.4	Controller state	CST	Controller state	Enum: 0: Automatic 1: Override control variable DB3		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Energy hold-off / Dew point	ERH	Energy hold-off / Dew point	Enum: 0: Normal 1: Energy hold-off/ Dew point		
30	2	DB0.1...DB0.0	Room occupancy	RO	Actual room occupancy	Enum: 0: Occupied 1: Unoccupied 2: StandBy 3: Frost		

A5-30: Digital Input

RORG	A5	**4BS Telegram**
FUNC	30	Digital Input
TYPE	01	Single Input Contact, Battery Monitor

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Supply voltage	SVC	Supply voltage (linear)	Enum: 0...120: Battery LOW 121...255: Battery OK		
16	8	DB1.7...DB1.0	Input State	IPS	Input State	Enum: 0...195: Contact closed 196...255: Contact open		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	**4BS Telegram**
FUNC	30	Digital Input
TYPE	02	Single Input Contact

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	28	DB3.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	Not Used (= 0)					
31	1	DB0.0	Input State	IPS	Input State	Enum: 0: Contact closed 1: Contact open		

RORG	A5	**4BS Telegram**
FUNC	30	Digital Input
TYPE	03	4 Digital Inputs, Wake and Temperature

Submitter: Afriso / EnOcean

Description:
This is used for universal modules with 4 digital inputs and a room temperature. The wake input signal of the device is provided to show the telegram transmission trigger. The application meaning and exact data interpretation of the digital channels depends on the end application and is not defined in this profile documentation.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Trigger event: wake event – application dependent

Teach-in method: 4BS teach-in 2

Appendix:
D1.4 – The Status of Wake signalizes the status of the WAKE PIN which has a special meaning in an ultra low application. Usually, by a status change of this input the module is triggered to perform a predefined operation.

Applications using this profile:

- water sensor conductive – Wake Status = 0 (water detected)
- pressure gauge with minimum or maximum (wake signal, configurable if min or max)
- indication and individual switching points (digital channels show different areas)

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Temperature	TMP	Temperature (linear)	255...0	0...40	°C
16	3	DB1.7...DB1.5	Not Used (= 0)					
19	1	DB1.4	Status of Wake	WA0	Value of wake signal	Enum: 0: Low 1: High		
20	1	DB1.3	Digital Input 3	DI3	Digital Input 3	Enum: 0: Low 1: High		
21	1	DB1.2	Digital Input 2	DI2	Digital Input 2	Enum: 0: Low 1: High		
22	1	DB1.1	Digital Input 1	DI1	Digital Input 1	Enum: 0: Low 1: High		
23	1	DB1.0	Digital Input 0	DI0	Digital Input 0	Enum: 0: Low 1: High		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

RORG	A5	4BS Telegram
FUNC	30	Digital Input
TYPE	04	3 Digital Inputs, 1 Digital Input 8 Bits

Submitter: Afriso / EnOcean

Description:
This profile is used for universal module with 1 analog input (= 8 bits resolution digital) and 3 digital inputs. The application meaning and exact data interpretation of the input channels depends on the end application and is not defined in this profile documentation.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Trigger event: values have changed
Teach-in method: 4BS teach-in 2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	16	DB3.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Digital value-input	DV0	Digital value 1 byte	0...255	0...255	N/A
24	4	DB0.7...DB0.4	Not Used (= 0)					

28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Digital Input 2	DI2	Measured digital Input 2	Enum: 0: Low 1: High
30	1	DB0.1	Digital Input 1	DI1	Measured digital Input 1	Enum: 0: Low 1: High
31	1	DB0.0	Digital Input 0	DI0	Measured digital Input 0	Enum: 0: Low 1: High

RORG	A5	**4BS Telegram**
FUNC	30	Digital Input
TYPE	05	Single Input Contact, Retransmission, Battery Monitor

Submitter: ITEC

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval:
- retransmission: 5 ... 255 seconds (one time configuration)
- number of retransmission times: 0 ... 127 times (one time configuration)
- heartbeat: 60 ... 65535 seconds (one time configuration)
Trigger event: digital input, retransmission, heartbeat
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: 4BS teach-in 2

Security
Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Not Used (= 0)					
8	8	DB2.7...DB2.0	Supply voltage	VDD	Supply voltage	0...255	0...3.3	V
16	1	DB1.7	Signal type	ST	Signal type	Enum: 0: Normal signal 1: Heart beat signal		
17	7	DB1.6...DB1.0	Index of Signals	IOS	Ordinal count	Enum: 0...127: Increment a counter by new telegram		
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

A5-37: Energy Management

RORG	A5	**4BS Telegram**
FUNC	37	Energy Management

TYPE	01	Demand Response

Submitter: Echoflex Solutions Inc.

Purpose of EEP:
Demand Response is a developing standard to allow utility companies to send requests for reduction in power consumption during peak usage times. It is also used as a means to allow users to reduce overall power consumption as energy prices increase. Having an EEP for this will allow ease of integration with EnOcean products to this standard. The EEP was designed with a very flexible setting for the level (0-15) as well as a default level whereby the transmitter can specify a specific level for all controllers to use (0-100% of either maximum or current power output, depending on the load type). This EEP also includes a timeout setting to indicate how long the DR event should last if the DR transmitting device does not send heartbeats or subsequent new DR levels.

Description:
This EEP is included under a new function of Energy Management. Additional types could be added in future for power, voltage, and current data. The proposed EEP type 01 only deals with demand response activation at this point. Data Byte 3 is the default DR value for devices that implement a control algorithm that uses a set-point. It will be used for any controllers not supporting the current DR Level in the message and having an adjustable set-point.

Data Byte 2 is the default DR Level for any controllers not supporting the current DR Level in the message and having an adjustable control. It can be defined as either a percentage of the maximum power or a percentage of the current power, depending on the value of bit 7 in Data Byte 2. Bits 0 through 6 contain the percentage of power (either relative or absolute) that should be used. A value of 0 corresponds to 0% and a value of 100 corresponds to 100%. Any value higher that n100 should be interpreted as 100%. For example, if the current DR level is not supported by the controller and Data Byte 2 bit 7 is 0 and Data Byte 2 bits 0 through 6 are set to 55, then the controller should try to use 55% of its maximum power usage. In the case of a lighting load with 0-10V dimming, this would correspond to 5.5V on the dimming line. In the case of a heating controller with a maximum set back of 5 degrees C, this would correspond to a set back of 2.75 degrees C (this would most likely be rounded to 3).

Data Byte 1 is the timeout for this DR event. After this command is sent the controller will stay at the DR level for Data Byte 1 multiplied by 15 minutes. Once this time has elapsed the controller will return to normal operation. If Data Byte 1 is 0 then the controller will remain in the DR event until the next DR command is received. This timeout allows DR devices to leave or turn off after setting controllers into a DR state, thus the DR transmitter is not needed to take the devices out of the DR state and the controllers will automatically recover. For example a DR transmitter that only sends messages when a DR event is active could be used with the timeout to create a successful DR system.

Data Byte 0, Bits 7 through 4 make up a nibble that will be used as the DR level. Levels 0 through 15 will be possible using these bits. Bit 4 will be the lowest bit in this nibble and bit 7 will be the highest. If any level is not supported by a controller then that controller should use the default settings sent in this message or map the level to one that it supports.

Data Byte 0 Bits 2 and 1 indicate whether the power adjustment at start and end of the DR event should be randomized or not. This feature is intended to minimize rapid changes on the power distribution equipment by delaying each controller's response. If random start or end is enabled, each controller will delay starting or ending the DR event by a random time that will vary uniformly over a specific time period (for example, 5 seconds, 60 seconds, or 15 minutes).. The maximum length of these random delays will depend on the implementation in the controller.

Data Byte 0, Bit 0 is the state for loads that are not adjustable for the default DR level. If a controller does not support the current DR level and does not have adjustable control then it should use this bit. The two states of this bit are defined as follows: 1 = maximum power usage by controller, 0 = minimum power usage by the controller. If for example lights are being controlled, then a setting of 1 will mean the lights should be ON, where as a setting of 0 will mean the lights should be OFF. For a thermostat application with non adjustable set back, a setting of 1 will mean that no set back should be applied, whereas a setting of 0 will mean that the full set back should be applied. This setting only applies to the maximum power usage of the controller, if for example the lights are currently off and the controller receives a DR event with this bit set, then the lights should not turn ON as the DR event has only set the maximum power usage for the device.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Temporary default	TMPD	New Temporary default DR set point Min. ... Max. (linear)	0...255	0...255	N/A
8	1	DB2.7	Absolute/relative power usage	SPWRU		Enum: 0: Absolute power usage. Interpret DB_2.BIT_6...DB_2.BIT_0 as a percentage of the maximum power use. 1: Relative power usage. Interpret DB_2.BIT_6...DB_2.BIT_0 as a percentage of the current power use.		

9	7	DB2.6...DB2.0	Power Usage	PWRU	0% to 100% power usage in 1% increments; 101...127 = interpreted as 100%	0...100	0...100	N/A
16	8	DB1.7...DB1.0	Timeout Setting	TMOS	Time in 15 min. intervals; 0 = No time specified; 1...255 = increasing 15 min. intervals. Max value: 3825 = 255*15	1...255	15...3825	min
24	4	DB0.7...DB0.4	DR Level	DRL	DR Level	0...15	0...15	N/A
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Random start delay	RSD	...	Enum: 0: False 1: True		
30	1	DB0.1	Randomized end delay	RED	...	Enum: 0: False 1: True		
31	1	DB0.0	Max/Min Power Usage for Default DR State	MPWRU		Enum: 0: Minimum Power usage 1: Maximum Power usage		

A5-38: Central Command

RORG	A5	**4BS Telegram**
FUNC	38	Central Command
TYPE	08	Gateway

Communication between gateway and actuator uses byte DB_3 to identify Commands. Commands 0x01 to 0x7F shall be common to all types belonging to this profile. Commands 0x80 to 0xFE can be defined individually for each device type.

0x01 Switching

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Command	COM	Command ID	Enum: 0x01:		
8	16	DB2.7...DB1.0	Time	TIM	Time in 1/10 seconds. 0 = no time specifed	1...65535	0.1...6553.5	s
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Lock/Unlock	LCK	Lock for duration time if time >0, unlimited time of no time specified. Locking may be cleared with „unlock". During lock phase no other commands will be accepted or executed	Enum: 0: Unlock 1: Lock		

30	1	DB0.1	Delay or duration	DEL	Delay or duration (if Time > 0); 0 = Duration (Execute switching command immediately and switch back after duration) 1 = Delay (Execute switching command after delay)	Enum: 0: Duration 1: Delay
31	1	DB0.0	Switching Command	SW	Switching Command ON/OFF	Enum: 0: Off 1: On

0x02 Dimming

REMARK:
Ramp time is the time needed to transition from minimum to maximum dimming levels.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Command	COM	Command ID	Enum: 0x02:		
8	8	DB2.7...DB2.0	Dimming value	EDIM	Dimming value (absolute [0...255] or relative [0...100])	0...255	0...100	%
16	8	DB1.7...DB1.0	Ramping time	RMP	Ramping time in seconds, 0 = no ramping, 1... 255 = seconds to 100%	0...255	0...255	s
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Dimming Range	EDIM R	Dimming Range	Enum: 0: Absolute value 1: Relative value		
30	1	DB0.1	Store final value	STR	Store final value	Enum: 0: No 1: Yes		
31	1	DB0.0	Switching Command	SW	Switching Command ON/OFF	Enum: 0: Off 1: On		

0x03 Setpoint shift

Submitter: Thermokon Sensortechnik GmbH

Used for changing set point, for example summer / winter compensation

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Command	COM	Command ID	Enum: 0x03:		
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Setpoint	SP	Setpoint shift	0...255	-12.7...12.8	K
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

0x04 Basic Setpoint

Submitter: Thermokon Sensortechnik GmbH

Send a new basic set point via DDC to an actuator

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Command	COM	Command ID	Enum: 0x04:		
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Basic Setpoint	BSP	Basic Setpoint	0...255	0...+51.2	°C
24	4	DB0.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	Not Used (= 0)					

0x05 Control variable

Submitter: Thermokon Sensortechnik GmbH

Set occupancy, energy holdoff and control directly actuator

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Command	COM	Command ID	Enum: 0x05:		
8	8	DB2.7...DB2.0	Not Used (= 0)					
16	8	DB1.7...DB1.0	Control variable override	CVOV	Control variable override	0...255	0...100	%
24	1	DB0.7	Not Used (= 0)					
25	2	DB0.6...DB0.5	Controller mode	CM	Controller Mode	Enum: 0: Automatic mode selection 1: Heating 2: Cooling 3: Off		
27	1	DB0.4	Controller state	CS	Controller state	Enum: 0: Automatic 1: Override		
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	1	DB0.2	Energy hold off	ENHO	Energy Hold Off	Enum: 0: Normal 1: Energy holdoff/ Dew point		
30	2	DB0.1...DB0.0	Room occupancy	RMOCC	Room occupancy	Enum: 0: Occupied 1: Unoccupied 2: Standby		

0x06 Fan stage

Submitter: Thermokon Sensortechnik GmbH

Set directly fan stage

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit

0	8	DB3.7...DB3.0	Command	COM	Command ID	Enum: 0x06:
8	8	DB2.7...DB2.0	Not Used (= 0)			
16	8	DB1.7...DB1.0	FanStage override	FO	FanStage override	Enum: 0: Stage 0 1: Stage 1 2: Stage 2 3: Stage 3 255: Auto
24	4	DB0.7...DB0.4	Not Used (= 0)			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	3	DB0.2...DB0.0	Not Used (= 0)			

0x07 Blind Central Command

Submitter: PEHA / infratec

With this central command all blinds, awnings and shutters can be manipulated.

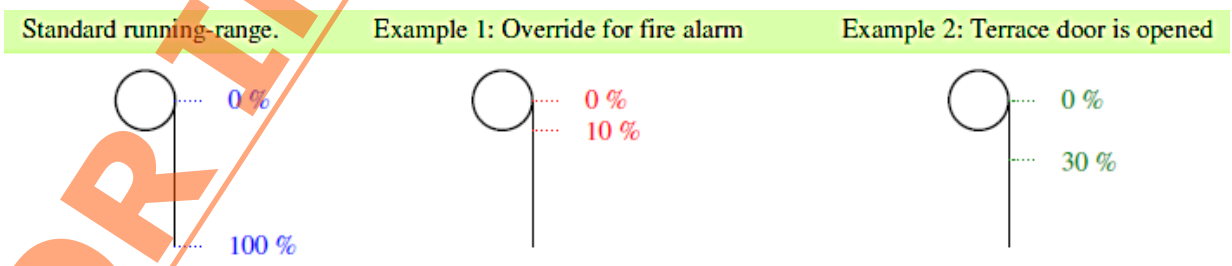
Remarks for data table:

REMARK 1:
The angle is usually available in blinds and awning modules.
Normally, in shutter modules the angle value is ignored.
The angle value can be set from -180° (e.g. maximum slat angle at the fully SHUT position) to 180° (e.g. maximum slat angle at the fully OPEN position).
The byte is set with following rule:
Bit7: Sign of the slat angle (0 = positive value, 1 = negative value)
Bit6..0: Slat angle value in 2° steps (e.g. 50 = 100°)

REMARK 2:
If this function (Blind drives to position with angle value) is not supported or not configured, use following rule:
- Position is 0 to 49% -> The blind opens
- Position is 50 to 100% -> The blind closes.

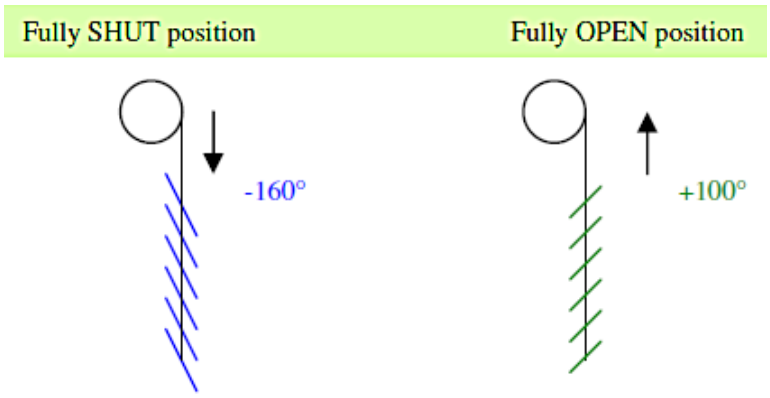
REMARK 3:
Conventional blinds and shutters can be configured with these 3 parameters to calculate the sufficiently accurate position and angle of the blind.

REMARK 4:
With this command you can adjust the minimal and maximal position of the blinds. So it's possible to override the running-range of blinds via a central control unit. Local operations are restricted and increase safety (e.g. to open blinds in case of wind or fire).
Condition: The Minimal value must be smaller or equal the maximal value.

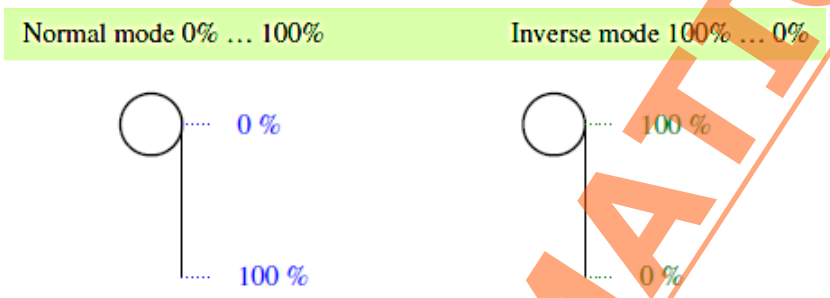


Example to lock the local functionality: Drive the shutters to a define position and set the minimal and maximal values to this position.

REMARK 5:
These to angle values describe the maximum slat angle at the fully SHUT position and the maximal slat angle at the fully OPEN position. With the time parameter, e.g.:



REMARK 6:
Set the position logic for the blind control and visualization.



Note: If the mode is changed, the minimum and maximal values (function 9) are converted as well!

REMARK 7:
For important central commands, it's not necessary to send directly the statefeedback, e.g. when many modules are activated simultaneously.
Note: Special functionality is in function "Status request (0)", the status is always sent.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Command	COM	Command ID	Enum: 0x07: Shutters / Blinds		
8	8	DB2.7...DB2.0	Parameter 1	P1	Function defined parameter value	Enum: Func. 00: -- not used -- Func. 01: -- not used -- Func. 02: -- not used -- Func. 03: -- not used -- Func. 04: 0% ... 100% e.g.: 0% = Blind fully open / 100% = Blind fully closed Func. 05: 0 ... 255 seconds Func. 06: 0 ... 255 seconds Func. 07: Runtime value to close the blind 0 ... 255 seconds		

						Func. 08: Runtime value for the sunblind reversion time This is the time to revolve the sunblind from one slat angle end position to the other end position: 0.0 … 25.5 seconds (0.1s steps) Func. 09: Set minimal position value 0 ... 100% Func. 10: Angle at the fully SHUT position Bit7 0 = positive sign Bit7 1 = negative sign Bit6...0 0 ... 90 Angle in 2° steps (e.g. 0 = 0°, 90 = 180°) Func. 11: Position logic 0 = Highest position = 0% / Lowest position = 100% 1 = Highest position = 100% / Lowest position = 0%
16	8	DB1.7...DB1.0	Parameter 2	P2	Function defined parameter value	Enum: Func. 00: -- not used -- Func. 01: -- not used -- Func. 02: -- not used -- Func. 03: -- not used -- Func. 04: Angel (see remark 1) Bit7 0 = positive sign Bit7 1 = negative sign Bit6...0 0 ... 90 Angle in 2° steps (e.g. 0 = 0°, 90 = 180°) Func. 05: 0.0 ... 25.5 seconds Func. 06: 0.0 ... 25.5 seconds Func. 07: Runtime value to open the blind 0 ... 255 seconds Func. 08: -- not used -- Func. 09: Set maximal position value 0 ... 100% Func. 10: Angle at the fully OPEN position Bit7 0 = positive sign Bit7 1 = negative sign Bit6...0 0 ... 90 Angle in 2° steps (e.g. 0 = 0°, 90 = 180°) Func. 11: -- not used --
24	4	DB0.7...DB0.4	Function	FUNC		Enum: 0: Do nothing, status request 1: Blind stops 2: Blind opens 3: Blind closes

						4: Blind drives to position with angle value (see remark 2) 5: Blind opens for time (position value) and angle (angle value) 6: Blind closes for time (position value) and angle (angle value) 7: Set Runtime parameters (see remark 3) 8: Set angle configuration (see remark 3) 9: Set Min, Max values (see remark 4) 10: Set slat angle for SHUT and OPEN position (see remark 5) 11: Set position logic (see remark 6)
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Send status flag	SSF	see remark 7	Enum: 0: Send new status of device 1: Send no status (e.g. Global central commands)
30	1	DB0.1	Pos. and Angle flag	PAF		Enum: 0: No Angle and position value available 1: Angle and position value available
31	1	DB0.0	Service Mode Flag	SMF		Enum: 0: Normal operation 1: Service mode: The module disables all senders, except this sender, which has set the service mode. (For example for maintenance)

RORG	A5	**4BS Telegram**
FUNC	38	Central Command
TYPE	09	Extended Lighting-Control

Submitter: PEHA / infratec

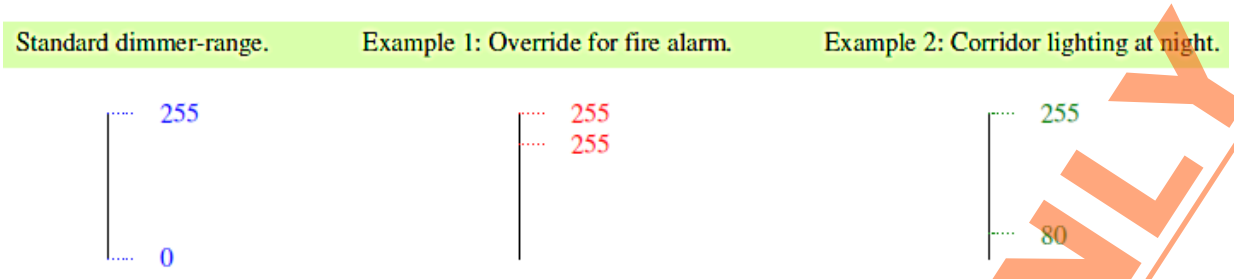
With this central command all lighting actors can be manipulated.

Remarks for data table:

REMARK 1:
Set the RGB level for corresponding lighting-control.
Devices without this feature ignore this command.

REMARK 2:
Up to 16 different scenes can be selected and configured.

REMARK 3:
Change the minimal and maximal dimmer-value. Example:



General for switchers:
The values 0 .. 127 are defined to "Off".
The values 128.. 255 are defined to "On".

REMARK 4:
Example: If the lamp was replaced, the operating hours are reset to 0.

REMARK 5:
This function blocks all other commands from the other taught-in transmitters. The transmitter, which has called this function, must delete the blocking state, before the other transmitters can use the device again.

REMARK 6:
For important central commands, it's not necessary to send directly the statefeedback, e.g. when many modules are activated simultaneously.
Note: Special functionality is in function "Status request (0)", the status is always sent.

REMARK 7:
Ramp time is the time needed to transition from minimum to maximum dimming levels.

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	DB3.7...DB3.0	Parameter 1	P1	Function defined parameter value	Enum: Func. 00: -- not used -- Func. 01: -- not used -- Func. 02: -- not used -- Func. 03: -- not used -- Func. 04: -- not used -- Func. 05: -- not used -- Func. 06: Dimm-Value (0 ... 255) Func. 07: R - Red (0 .. 255) Func. 08: -- not used -- Func. 09: Dimm-Value (0 ... 255) Func. 10: Lamp operating hours (MSB 15..8) Func. 11: -- not used -- Func. 12: Energy metering value (MSB 15..8)		
8	8	DB2.7...DB2.0	Parameter 2	P2	Function defined parameter value	Enum: Func. 00: -- not used -- Func. 01: -- not used -- Func. 02: -- not used -- Func. 03: Ramping time (MSB 15...8) (65535 s)		

						Func. 04: Ramping time (MSB 15...8) (65535 s) Func. 05: -- not used -- Func. 06: Ramping time (MSB 15...8) (65535 s) Func. 07: G - Green (0 ... 255) Func. 08: -- not used -- Func. 09: Dimm-Value (0 ... 255) Func. 10: Lamp operating hours (7...0 LSB) Func. 11: -- not used -- Func. 12: Energy metering value (7..0 LSB)
16	8	DB1.7...DB1.0	Parameter 3	P3	Function defined parameter value	Enum: Func. 00: -- not used -- Func. 01: -- not used -- Func. 02: -- not used -- Func. 03: Ramping time (7...0 LSB) (65535 s) Func. 04: Ramping time (7...0 LSB) (65535 s) Func. 05: -- not used -- Func. 06: Ramping time (7...0 LSB) (65535 s) Func. 07: B - Blue(0 ... 255) Func. 08: Bit7: 0 = Drive to scene-value Bit7: 1 = Stores actual value in the scene Bit3..0: Scene number 0 ... 15 Func. 09: -- not used -- Func. 10: -- not used -- Func. 11: Blocks the local operations Enum: 0 = Unlock local operations 1 = Locking switch on commands 2 = Locking switch off commands 3 = Locking local operations Func. 12: Unit of energy metering value Enum: 0 = mW 1 = W 2 = kW 3 = MW 4 = Wh 5 = kWh 6 = MWh 7 = GWh 8 = mA 9 = 1/10 A 10 = mV 11 = 1/10 V 12 ... 15 Not used

24	4	DB0.7...DB0.4	Function	FUNC		Enum: 0: Do nothing, status request 1: Switched off 2: Switched on (Memory value) 3: Dimming up with ramping time 4: Dimming down with ramping time 5: Dimming stops 6: Set dimmer-value and ramping time 7: Set RGB values (see remark 1) 8: Scene function (see remark 2) 9: Set minimal and maximal dimmer-value (see remark 3) 10: Set the operating hours of the lamp (see remark 4) 11: Locking local operations (see remark 5) 12: Set a new value for the energy metering (overwrite the actual value with the selected unit)
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	1	DB0.2	Send status flag	SSF	see remark 6	Enum: 0: Send new status of device 1: Send no status (e.g. Global central commands)
30	1	DB0.1	Store final value	SFV		Enum: 0: No 1: Yes
31	1	DB0.0	Service Mode Flag	SMF		Enum: 0: Normal operation 1: Service mode: The module disables all senders, except this sender, which has set the service mode. (For example for maintenance)

A5-3F: Universal

RORG	A5	**4BS Telegram**
FUNC	3F	Universal
TYPE	00	Radio Link Test (BI-DIR)

Submitter: PROBARE

Units supporting the EEP Radio Link Test shall offer a functionality that allows for radio link testing between them (Position A to Position B, point-to-point only). Testing shall be possible without the need for prior teach-in and as an option it shall cover two way communications.

Further, testing shall be backward compatible to existing EnOcean installations that support at least 1BS (RORG=0xD5) and 4BS (RORG=0xA5) EnOcean messages.

The main area of RLT application are in-field testing of radio links between portable test equipment placed at different locations as well as between portable test equipment and fixed installation, e.g. an EnOcean Gateway.

Functional description of RLT:

When two units perform radio link testing one unit needs to act in a mode called RLT Master and the other unit needs to act in a mode called RLT Slave. On a RLT enabled unit one or both modes may be supported. The mode(s) supported shall require explicitly activation at run time.
After activation a RLT Master listens for RLT_Query messages. On reception of at least one RLT_Query message a RLT Master responds with an RLT_Response message. Following that it starts transmission of RLT_MasterTest messages within a maximum time frame of 250ms and awaits the response from the RLT Slave for each RLT_MasterTest message sent. A radio link test communication consists of a minimum of 16 and a maximum of 256 RLT_MasterTest messages. Timing distance between individual RLT_MasterTest messages shall not exceed 250ms. When the radio link test communication is completed the RLT Master gets deactivated automatically.
After activation a RLT Slave periodically transmits RLT_Query messages (1 message / 2s). It stops transmission of RLT_Query messages as soon as it has received at least one RLT_Response message. It then waits for RLT_MasterTest messages from the same EnOcean ID and replies to them within a maximum delay of 100ms thru RLT_SlaveTest messages. If it does not receive RLT_MasterTest messages from the same EnOcean ID for a time period of 5s, the RLT Slave restarts periodic transmission of RLT_Query messages. The RLT Slave requires explicit deactivation.

RLT_Query Message

This Message is a "4BS Teach-In Query" message with FUNC, Type and Manufacturer ID set properly. For details please refer to the description of the 4BS teach-in process.

RLT_Response Message

This Message is a "4BS Teach-In Response" message with FUNC, Type and Manufacturer ID set properly. For details please refer to the description of the 4BS teach-in process. As a RLT Master does accept teach-in of a RLT Slave only for the time period required by a single RLT communication it shall indicate the EEP to be supported but the EnOcean ID of the RLT Slave not to be stored permanently.

RLT_MasterTest_4BS

This is the 4BS message sent by the RLT Master during a radio link test communication
DIRECTION- 1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	28	DB3.7...DB0.4	Not Used (= 0)					
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	2	DB0.2...DB0.1	MSG_ID	MSGID	Message ID	Enum: 2:		
31	1	DB0.0	MSG-Source	MSGS	Message Source	Enum: 0: RLT-Master		

RLT_SlaveTest_4BS

This is the 4BS message sent by the RLT Slave in reply to an RLT_MasterTest_4BS message.
DIRECTION- 2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	2	DB3.7...DB3.6	Sub-Telegram Counter	STCNT	related to RLT_MasterTest_4BS message received Repeater level 2	Enum: 0: not supported 1: 1 sub telegram 2: 2 sub telegram 3: ≥ 3 sub telegram		
2	6	DB3.5...DB3.0	RSSI Level in dBm	RSLV	related to RLT_MasterTest_4BS message received Repeater level 1	Enum: 0x00: not supported 0x01: ≥-31		dBm

						-32 0x02: dBm
						≤-93 0x3F: dBm
8	8	DB2.7...DB2.0	Sub-Telegram Counter/RSSI Level in dBm	RSLV	Related to RLT_MasterTest_4BS message received Repeater level 1 (for details see DB3)	Enum: : See prev
16	8	DB1.7...DB1.0	Sub-Telegram Counter/RSSI Level in dBm	RSLV	Related to RLT_MasterTest_4BS message received direct link	Enum: : See prev
24	4	DB0.7...DB0.4	RSSI Level in dBm	RSLV	Non-EnOcean signal detection since last RLT_MasterTest message RSSI Level with 6dB quantization steps	Enum: 0x00: not supported 0x01: ≥ -31 dBm 0x02: -32...-37 dBm 0x03: -38...-43 dBm 0x04: -44...-49 dBm 0x05: -50...-55 dBm 0x06: -56...-61 dBm 0x07: -62...-67 dBm 0x08: -68...-73 dBm 0x09: -74...-79 dBm 0x0A: -80...-85 dBm 0x0B: ≤ -92 dBm
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram
29	2	DB0.2...DB0.1	MSG_ID	MSGID		Enum: 2:
31	1	DB0.0	MSG-Source	MSGS		Enum: 1: RLT-Slave

RLT_MasterTest_1BS

This is the 1BS message sent by the RLT Master during a radio link test communication.

REMARK: The column 'Bitrange' is automatically generated from the telegram type and the offset. The column Bitrange shows currently DB_3 instead of DB_0. This isn't a bug in the XML, only a weakness of the formatting. AT THIS POINT, DB_0 WOULD BE CORRECT.

DIRECTION- 1

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	DB3.7...DB3.4	RLT MSG-Counter MSB	MC-MSB	Round-trip, covering all RLT_x_1BS messages 4 bit MSB	Enum: :		
4	1	DB3.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
5	2	DB3.2...DB3.1	RLT MSG-Counter LSB	MC-LSB	Round-trip, covering all RLT_x_1BS messages 2 bit LSB	Enum: :		

7	1	DB3.0	MSG-Source	MSGS	Message Source	Enum: 0: RLT Master

RLT_SlaveTest_1BS

This is the 1BS message sent by the RLT Slave in reply to an RLT_MasterTest_1BS message.

REMARK: The column 'Bitrange' is automatically generated from the telegram type and the offset. The column Bitrange shows currently DB_3 instead of DB_0. This isn't a bug in the XML, only a weakness of the formatting. AT THIS POINT, DB_0 WOULD BE CORRECT.

DIRECTION- 2

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	DB3.7...DB3.4	RLT MSG-Counter MSB	MC-MSB	Round-trip, covering all RLT_x_1BS messages 4 bit MSB	Enum: :		
4	1	DB3.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
5	2	DB3.2...DB3.1	RLT MSG-Counter LSB	MC-LSB	Round-trip, covering all RLT_x_1BS messages 2 bit LSB	Enum: :		
7	1	DB3.0	MSG-Source	MSGS	Message Source	Enum: 1: RLT-Slave		

RORG	A5	**4BS Telegram**
FUNC	3F	Universal
TYPE	7F	Universal

Submitter: EnOcean GmbH

Description
This profile was intended for manufacturer specific applications. Every manufacturer may independently define the types within this profile.

This profile was replaced by the use of MSC-Telegrams with the advantage of more payloads and the manufacturer Id as identification. For future applications only use MSC-Telegrams.

This description is only necessary for legacy reasons.

Data exchange
Direction: unidirectional / bidirectional
Addressing: unicast (ADT) / broadcast
Communication trigger: event- & time-triggered
Communication interval: application specific
Trigger event: application specific
Tx delay: not specified
Rx timeout: not specified

Teach-in
Teach-in method: 4BS teach-in

Security
Encryption supported: no
Security level format: -

Offset	Size	Bitrange	Data	ShortCut	Description	Valid Range	Scale	Unit
0	28	DB3.7...DB0.4	undefined	undef	undefined			
28	1	DB0.3	LRN Bit	LRNB	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		
29	3	DB0.2...DB0.0	undefined	undef	undefined			

D2: VLD Telegram

D2-00: Room Control Panel (RCP)

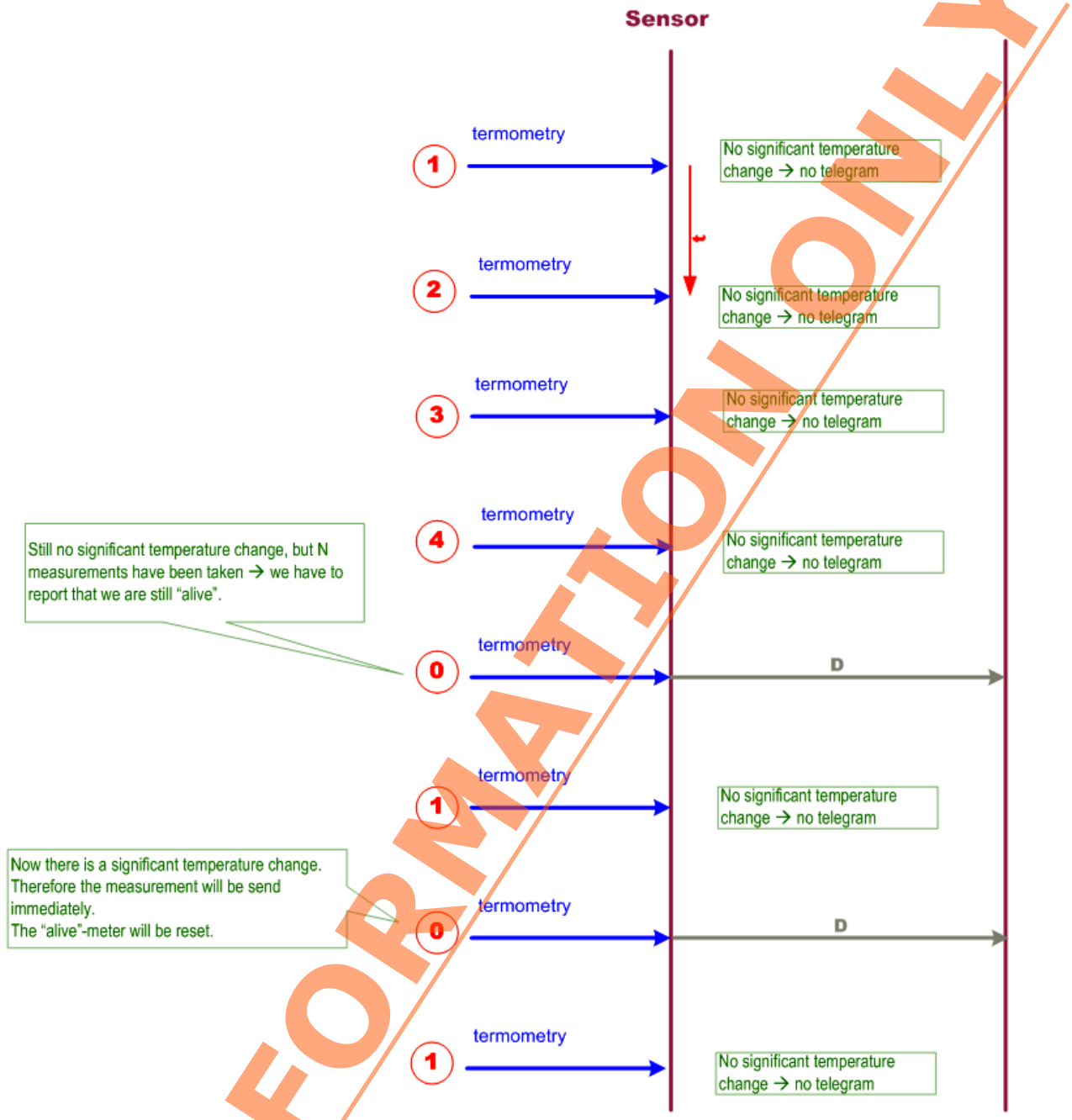
The Communication is based on the Smart Ack concept. Some basics related hereto are included in this document for convenience but for details please consult the Smart Ack specification.

A Room Control Panel (RCP) compliant to this EEP offers the following features:

- Multi symbol, multi segment LC display (or equivalent)
- 1 temperature measurement channel, remote configurable
- 1 temperature set point control (e.g. key pad based)
- 1 fan speed control (e.g. key pad based)
- 1 presence control (e.g. key pad based)

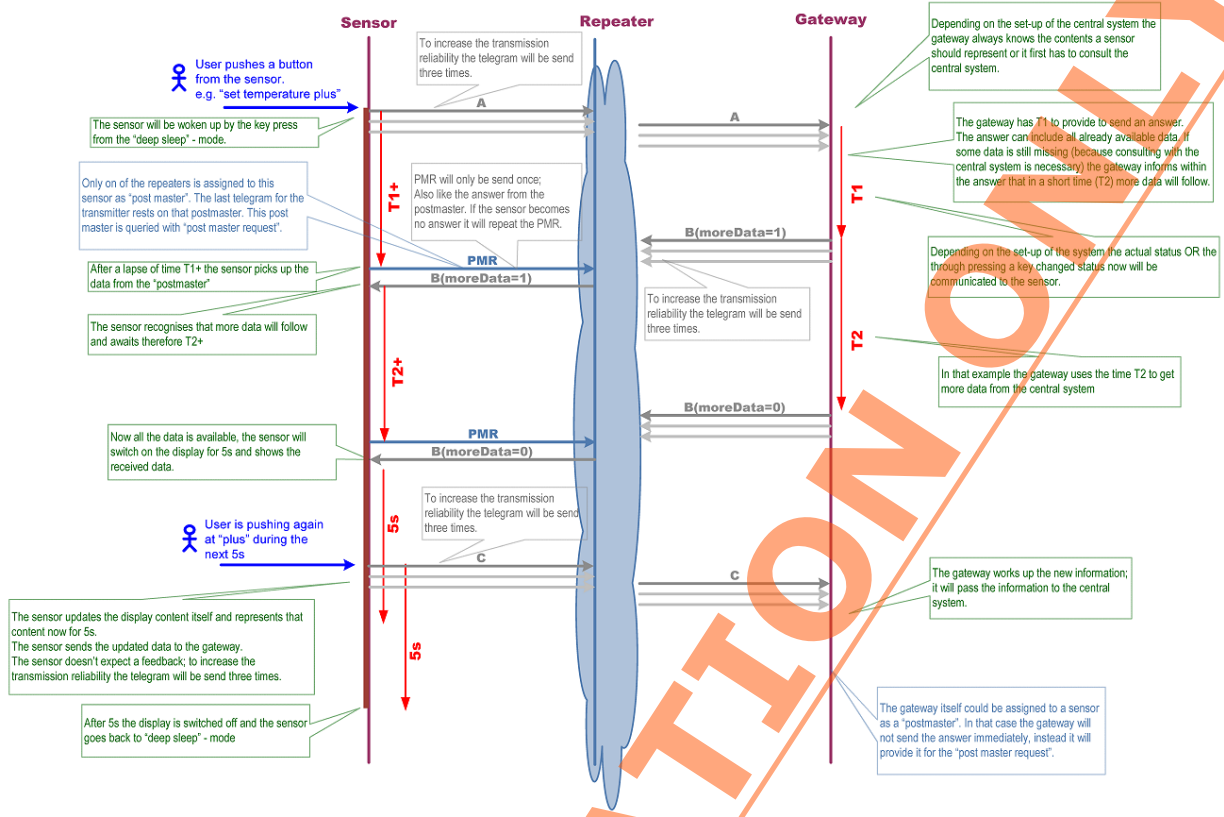
Repeater operation shall work in compliance with the Smart Ack specification.

Use Case: Temperature Measurement

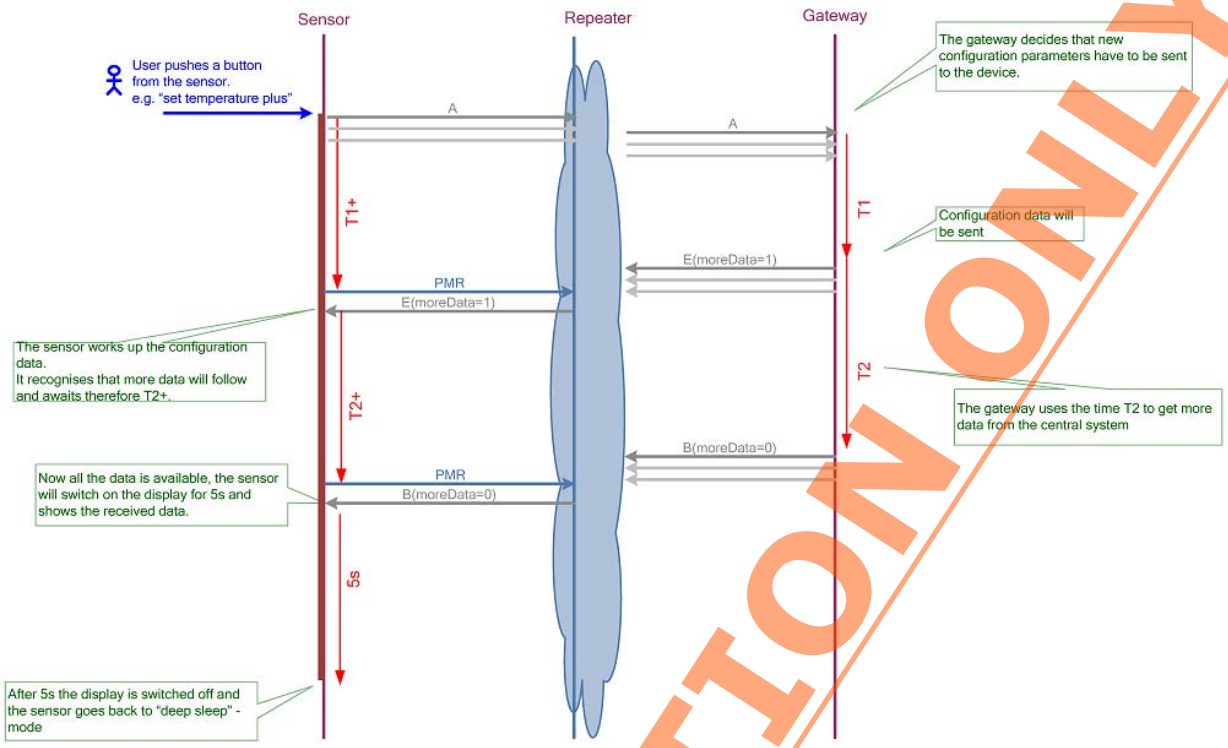


REMARK:
Temperature measurement may be configured by the Gateway, see chapter "Message Type E – RCP Configuration".

Use Case: User Interaction



Use Case: User Interaction including transfer of configuration data



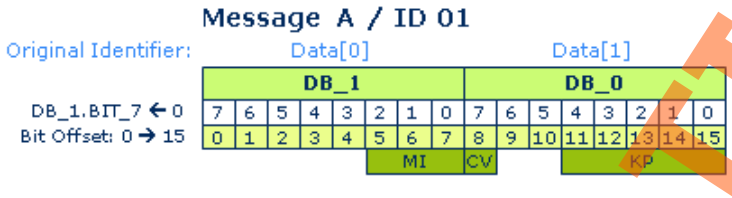
RORG	D2	VLD Telegram
FUNC	00	Room Control Panel (RCP)
TYPE	01	RCP with Temperature Measurement and Display (BI-DIR)

Submitter: Fr. Sauter AG

Note: EEP Release 2.1, 2.5, and 2.6 reflected a wrong byte-order for all messages of this EEP!
Example Message Type A:
Instead of DB_1 = 0x01 DB_0 = 0x81 (which is correct for KP=1 and CV=1)
by mistake DB_1 = 0x81 DB_0 = 0x11 (which is wrong) was printed.
We apologize for the mistake.

Message type A / ID 01 (First User Action on RCP)

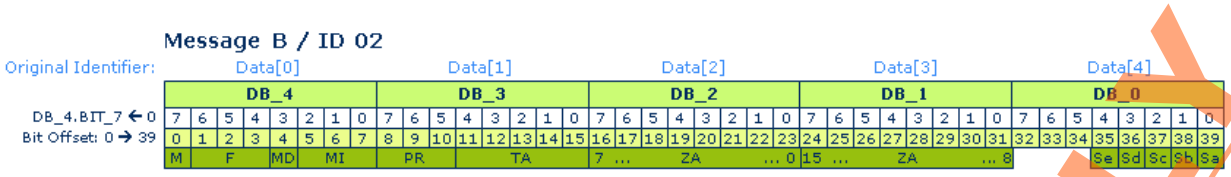
Direction: Sensor -> Gateway
Transaction Response: Message Type B or Type E
Chaining: No
Timing: T1+ = 170ms



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	5	Not Used (= 0)					
5	3	MsgId	MI	Message Id; 0x01	Enum: 1: Message Id		
8	1	ConfigValid	CV		Enum: 0x00: Configuration data not valid (e.g. never received message of type E) 0x01: Configuration data valid		
9	2	Not Used (= 0)					
11	5	User Action	KP		Enum: 0x00: not used; 0x01: Presence; 0x02: Temperature Set Point "down" or "—"; 0x03: not used; 0x04: not used; 0x05: Temperature Set Point "up" or "+"; 0x06: Fan; 0x07...0x1F: Not Used		

Message Type B / ID 02 (Display Content)

Direction: Gateway -> Sensor
Reply to Message Type A
Response: None
Chaining: Up to 2 messages per chain
Timing: T2+ = 300ms



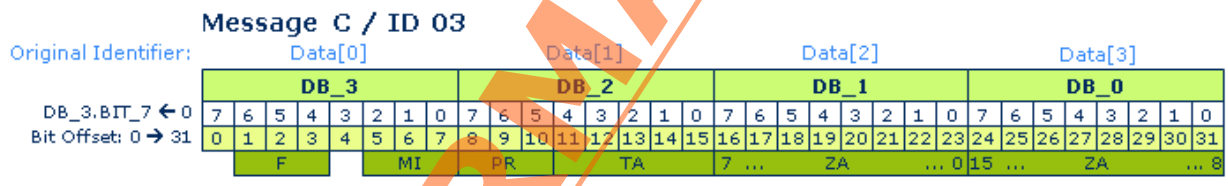
IMPORTANT NOTE:
The symbols Sa, Sb, Sc, Sd, Se are optional. One or more of those symbols are available on the display only if the manufacturer of a RCP implements them in a specific design. Thus, they are NOT mandatory for a RCP in order to comply with this EEP.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Fan manual	M		Enum: 0: Auto 1: Fan manual		
1	3	Fan	F		Enum: 0x00: Do not display 0x01: Speed Level 0 0x02: Speed Level 1 0x03: Speed Level 2 0x04: Speed Level 3 0x05...0x07: not used		
4	1	MoreData	MD		Enum: 0x00: no more data 0x01: more data will follow after T2+		
5	3	MsgId	MI	Message Id;0x02	Enum: 2: Message Id		
8	3	Presence	PR		Enum: 0x00: Do not display 0x01: Present 0x02: Not present 0x03: Night time reduction 0x04...0x07: not used		
11	5	Figure A Type	TA		Enum: 0x00: Do not display 0x01: Room Temperature 0x02: Room Temperature 0x03: Nominal Temperature 0x04: Nominal Temperature 0x05: Delta Temperature Set Point 0x06: Delta Temperature Set Point 0x07: Delta Temperature Set Point(graphic) 0x08: Time 00:00 to 23:59 [24h] 0x09: Time 00:00 to 11:59 [AM] 0x0A: Time 00:00 to 11:59 [PM] 0x0B: Date 01.01 to 31.12 [DD.MM] 0x0C: Date 01.01 to 12.31 [MM.DD] 0x0D: Illumination (linear) 0 to 9999 0x0E: Percentage 0 to 100 0x0F: Parts per Million 0 to 9999 0x10: Relative Humidity 0 to 100 0x11...0x1F: not used	 °C °F °C °F °C °F lx % ppm % rH	
16	16	Figure A Value	ZA	Format according to TA: Byte-Order: Little-Endian!	Enum: 0x01...0x07: 0 ... 4000 0x08...0x0A: Time 0000 ... 2359 0x0B...0x0C: Date 0101 ... 3112 0x0D: 0 ... 9999	0.01° lx	

					0x0E...0x10: 0 ... 10000 0.01% 0x0F: 0 ... 9999 ppm
32	3	Not Used (= 0)			
35	1	User Notification	Se	optional	Enum: 0x0: Off 0x1: On
36	1	Window	Sd	optional	Enum: 0x0: Closed 0x1: Opened
37	1	Dew-Point	Sc	optional	Enum: 0x0: Warning 0x1: No warning
38	1	Cooling	Sb	optional	Enum: 0x0: Off 0x1: On
39	1	Heating	Sa	optional	Enum: 0x0: Off 0x1: On

Message Type C / ID 03 (Repeated User Action on RCP)

Direction: Sensor -> Gateway
Fire and Forget
Response: None
Chaining: No
Timing: may only be sent within 5s from latest receipt of a Message Type B

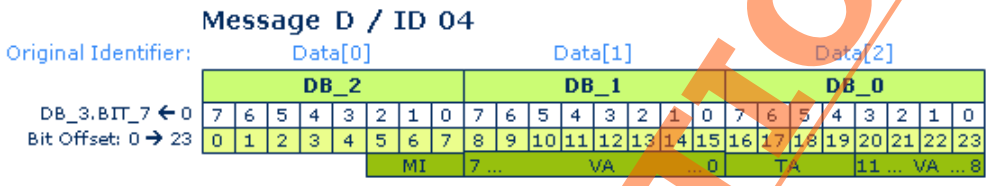


Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	3	Fan	F		Enum: 0x00: no change 0x01: Speed Level 0 0x02: Speed Level 1 0x03: Speed Level 2 0x04: Speed Level 3 0x05: Speed Level Auto 0x06...0x07: not used		
4	1	Not Used (= 0)					
5	3	MsgId	MI	Message Id; 0x03	Enum: 3: Message Id		
8	3	Presence	PR		Enum: 0x00: no change 0x01: Present 0x02: Not present 0x03: Night time reduction 0x04...0x07: not used		
11	5	Set Point A Type	TA		Enum: 0x00: no change		

					not used 0x01...0x04:		
					0x05: Temperature Set Point [°]		
					0x06...0x1F: not used		
16	16	Set Point A Value	ZA	Format according to TA: 0x05 [0.01°] Byte-Order: Little-Endian!	-1270...+1270	-12.70...+12.70	°

Message Type D / ID 04 (Measurement Result)

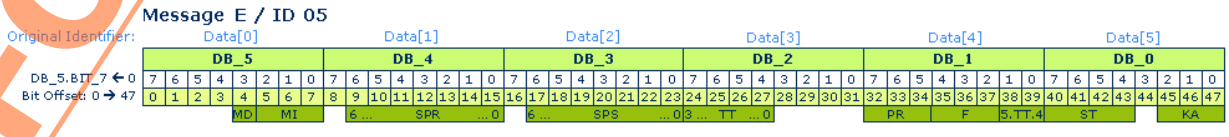
Direction: Sensor -> Gateway
Fire and Forget
Response: None
Chaining: No
Timing: None



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	5	Not Used (= 0)					
5	3	MsgId	MI	Message Id;0x04	Enum: 4: Message Id		
8	8	Channel A Value	VA (LSB)	Format according to TA: LSB (Bit 7 ... 0)	0...4000	0...40.00	°
16	4	Channel A Type	TA		Enum: 0x00: Temperature [°C] 0x01...0x0E: not used 0x0F: Measurement result not valid		
20	4	Channel A Value	VA (MSB)	See: VA (LSB) MSB (Bit 11 ... 8)			

Message Type E / ID 05 (Sensor Configuration)

Direction: Gateway -> Sensor
Reply to Message Type A
Response: None
Chaining: Up to 2 messages per chain
Timing: T2+ = 300ms



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	1	MoreData	MD		Enum: 0x0: no more data 0x1: more data will follow after T2+		
5	3	MsgId	MI	Message Id; 0x05	Enum: 5: Message Id		
8	1	Not Used (= 0)					
9	7	Set Point Range Limit	SPR	Limit of Set Point Range, absolute value: REMARK: Set Point Range shall be symmetrical to 0°	Enum: 0x00: Set Point disabled 0x01...0x7F: 0,1° … 12,7° [0,1°]	0.1...12.7	°
16	1	Not Used (= 0)					
17	7	Set PointSteps	SPS	Number of Set Point Steps: REMARK: Specifies the number of equidistant steps between 0 and Set Point Range Limit	Enum: 0x00: Set Point disabled 0x01...0x7F: 1 … 127	1...127	
24	4	Temperature Measurement Timing	TT (LSB)	Time between two subsequent Temperature measurements LSB (Bit 3 ... 0)	Enum: 0x00: Temperature measurement disabled 0x01...0x3C: 10 … 600s [10s]	10...600	s
28	4	Not Used (= 0)					
32	3	Presence	PR	Number of Presence Levels available to user	Enum: 0x0: Presence disabled 0x1...0x7: 1 … 7	1...7	
35	3	Fan	F	Number of Fan Speed Levels available to user:	Enum: 0x0: Fan Speed disabled 0x1...0x7: 1 … 7	1...7	
38	2	Temperature Measurement Timing	TT (MSB)	Time between two subsequent Temperature measurements MSB (Bit 5 ... 4)			
40	4	Significant Temperature Difference	ST	Difference between two subsequent temperature measurements to trigger a Message Type D [0.2°]	0x0...0xF	0.0...3.0	°
44	1	Not Used (= 0)					
45	3	Keep Alive Timing	KA	Number of measurements (without trigger of a message Type D) between two subsequent "Keep Alive messages":	Enum: 0x0: Transmission of measurement result with each Temperature measurement 0x1...0x7: 10 … 70 measurements [step-size 10]	10...70	

D2-01: Electronic switches and dimmers with Energy Measurement and Local Control

This EEP family shall be used for bidirectional actuators that control electric loads, e.g. for lightning purposes. Switching and dimming is controlled and high-resolution energy measurement is supported. Local Control, either thru a user interface or thru other measures shall be supported on the actuator. This may include other EnOcean enabled devices taught-in to a device belonging to the EEP family, e.g. a simple rocker switch or more sophisticated devices

like occupancy sensors with timing control. The proposed EEP family serves up to 30 output channels and allows controlling them either individually or as a bulk. Extension of this EEP family is possible in different ways:

1. A new device with a different feature mix creates a new TYPE within this EEP family
-> new column in following table

2. An additional feature is added and a new device with a new TYPE is created
-> new column and new line in following table

3. Like 2, but EnOcean communication of the EEP family needs to be extended
-> new column and new line in following table
-> one or more additional messages need to be defined

For teach-in and teach-out UTE (Universal Uni- and Bidirectional Teach-In Procedure for EEP based Communication) shall be used.

Type	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14
No. of output channels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	4	8
Switching	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Dimming	-	-	X	X	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Dimming configurable	-	-	-	-	X	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Pilot wire	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
Local control	X	X	X	X	X	X	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X
Local control enable/disable	-	-	-	-	X	X	-	-	X	-	X	X	X	X	X	X	-	-	X	-	-
External Switch / Push Button Control	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-
External Switch / Push Button Type	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-
Auto OFF Timer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-
Delay OFF Timer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-
Taught-in devices enable/disable 2)	-	-	-	-	X	X	-	-	X	X	X	X	X	X	X	X	-	-	X	-	-
User interface day/night mode	-	-	-	-	-	X	-	-	X	-	X	X	X	X	X	X	-	-	X	-	-
Over current reporting	-	-	-	-	X	X	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-
Over current configurable	-	-	-	-	X	X	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-
Energy measurement	X	-	X	-	X	X	X	-	X	X	-	X	X	-	X	-	X	-	-	-	-
Power measurement	-	-	-	-	X	X	-	-	X	X	-	X	X	-	X	-	-	-	-	-	-
Measurement Roll Over 1)	X	-	X	-	-	-	X	-	-	-	-	X	-	-	X	-	X	-	-	-	-
Measurement Auto Scaling 1)	-	-	-	-	X	X	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-
Measurement configurable	-	-	-	-	-	X	-	-	X	X	-	X	X	-	X	-	-	-	-	-	-
Measurement report on query	X	-	X	-	X	X	X	-	X	X	-	X	X	-	X	-	X	-	-	-	-
Measurement auto reporting	-	-	-	-	X	X	-	-	X	X	-	X	X	-	X	-	-	-	-	-	-
Default state configurable	-	-	-	-	-	X	-	-	X	X	X	X	X	X	X	X	-	-	X	-	-
Error level reporting	-	-	-	-	-	X	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-
Power Failure Detection	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-
Power Failure Detection enable/disable	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-

1) A device may either support Measurement Roll Over or Measurement Auto Scaling.

2) Enable / disable only effects devices that are taught-in to a device belonging to this EEP family;
it does not effect communication between a device belonging to this EEP family and any other entity where this device has been taught-in by itself.

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	00	Type 0x00

Submitter: Team

CMD 0x1 - Actuator Set Output

This message is sent to an actuator. It controls switching / dimming of one or all channels of an actuator.

Command ID 01 (CMD)

	DB_2								DB_1								DB_0							
DB_2.BIT_7 ← 0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Bit Offset: 0 → 23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
					CMD				dim value			I/O channel					Output Value %							

REMARK:
In case an Actuator Set Output message specifies a parameter that is not supported by the device being addresses, such device shall react as following:
- channel not supported by device -> ignore message
- dimming command to switching device -> no change of status
- dimming command with non supported speed -> dim with regular speed

RECOMMENDATION:
Dimmers should take things like phase shifting into account to provide dimming based on power consumption (results in brightness for lamps) rather than interpreting percentage values as phase angle only.

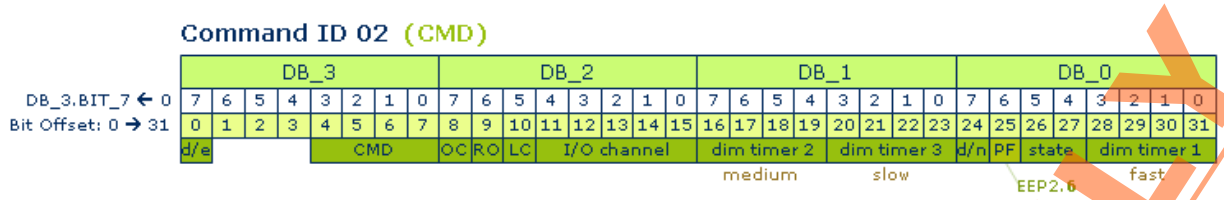
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	command identifier	Enum: 0x01: ID 01		
8	3	Dim value	DV		Enum: 0x00: Switch to new output value 0x01: Dim to new output value – dim timer 1 0x02: Dim to new output value – dim timer 2 0x03: Dim to new output value – dim timer 3 0x04: Stop dimming 0x05...0x07: not used		
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: All output channels supported by the device 0x1F: Input channel (from mains supply)		
16	1	Not Used (= 0)					
17	7	Output value	OV		Enum: 0x00: Output value 0% or OFF 0x01...0x64: Output value 1% to 100% or ON 0x65...0x7E: Not used 0x7F: Output value not valid / not applicable		

CMD 0x2 - Actuator Set Local

This message is sent to an actuator. It configures one or all channels of an actuator.

Response Timing: None

RECOMMENDATION:
In case the device implements an internal order for dim timers, this order should be from “dim timer 1” (fast) to “dim timer 3” (slow). The configured time shall always be interpreted for a full range (0 to 100%) dimming.



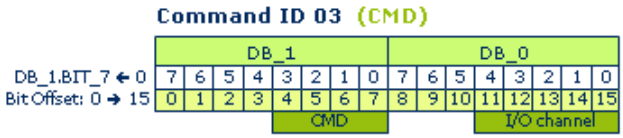
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Taught-in devices	d/e		Enum: 0b0: Disable taught-in devices (with different EEP) 0b1: Enable taught-in devices (with different EEP)		
1	3	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x02: ID 02		
8	1	Over current shut down	OC		Enum: 0b0: Over current shut down: static off 0b1: Over current shut down: automatic restart		
9	1	reset over current shut down	RO		Enum: 0b0: Reset over current shut down: not active 0b1: Reset over current shut down: trigger signal		
10	1	Local control	LC		Enum: 0b0: Disable local control 0b1: Enable local control		
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: All output channels supported by the device 0x1F: Input channel (from mains supply)		
16	4	Dim timer 2	DT2		Enum: 0x00: Not used 0x01...0x0F: Dim timer 2 [0,5 … 7,5s / steps 0,5s]		
20	4	Dim timer 3	DT3		Enum: 0x00: Not used 0x01...0x0F: Dim timer 3 [0,5 … 7,5s / steps 0,5s]		
24	1	User interface indication	d/n		Enum: 0b0: User interface indication: day operation 0b1: User interface indication: night operation		
25	1	Power Failure	PF		Enum: 0b0: Disable Power Failure Detection 0b1: Enable Power Failure Detection		
26	2	Default state	DS		Enum: 0b00: Default state: 0% or OFF 0b01: Default state: 100% or ON 0b10: Default state: remember previous state 0b11: Not used		

28	4	Dim timer 1	DT1		Enum: 0x00: Not used 0x01...0x0F: Dim timer 1 [0,5 … 7,5s / steps 0,5s]

CMD 0x3 - Actuator Status Query

This message is sent to an actuator. It requests the status of one or all channels of an actuator.

Response Timing:
An Actuator Status Response message shall be received within a maximum of 300ms from the time of transmission of this message. In case no such response is received within this time frame the action shall be treated as completed without result.

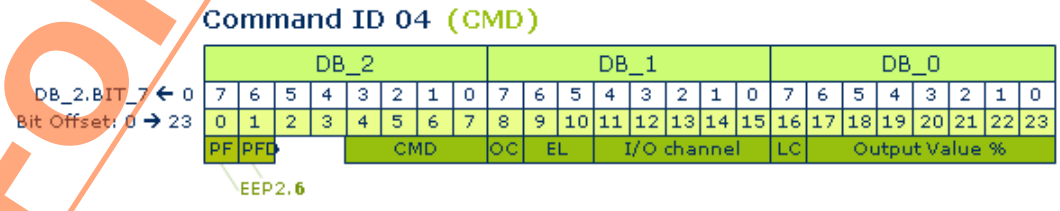


Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x03: ID 03		
8	3	Not Used (= 0)					
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: All output channels supported by the device 0x1F: Input channel (from mains supply)		

CMD 0x4 - Actuator Status Response

This message is sent by an actuator if one of the following events occurs:
- Status of one channel has been changed locally
- Message Actuator Status Query has been received

Response Timing:
This message shall be sent within a maximum of 50ms from the time of reception of the Actuator Status Query message.



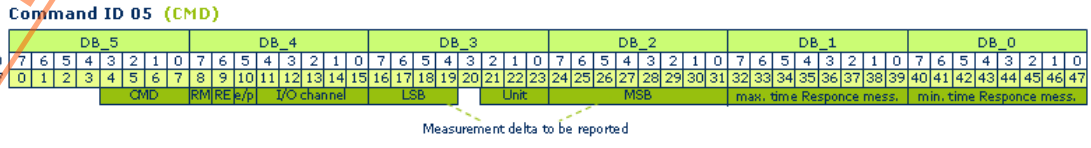
REMARK 1:
In case an Actuator Status Query message specifies a parameter that is not supported by the device being addresses, such device shall ignore the message and shall not answer using the Actuator Status Response message.
REMARK 2:
In case an Actuator Status Query message queries all output channels supported by a device being addresses, such device shall answer per each output channel by using an individual Actuator Measurement Response message.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Power Failure	PF		Enum: 0b0: Power Failure Detection disabled/not supported 0b1: Power Failure Detection enabled		
1	1	Power Failure Detection	PFD		Enum: 0b0: Power Failure not detected/not supported/disabled 0b1: Power Failure Detected		
2	2	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x04: ID 04		
8	1	Over current switch off	OC		Enum: 0b0: Over current switch off: ready / not supported 0b1: Over current switch off: executed		
9	2	Error level	EL		Enum: 0b00: Error level 0: hardware OK 0b01: Error level 1: hardware warning 0b10: Error level 2: hardware failure 0b11: Error level not supported		
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: Not applicable, do not use 0x1F: Input channel (from mains supply)		
16	1	Local control	LC		Enum: 0b0: Local control disabled / not supported 0b1: Local control enabled		
17	7	Output value	OV		Enum: 0x00: Output value 0% or OFF 0x01...0x64: Output value 1% to 100% or ON 0x65...0x7E: Not used 0x7F: output value not valid / not set		

CMD 0x5 - Actuator Set Measurement

The command defines values at offset 32 and at offset 40 which are the limits for the transmission periodicity of messages. MIT must not be set to 0, MAT >= MIT.

Response Timing: None

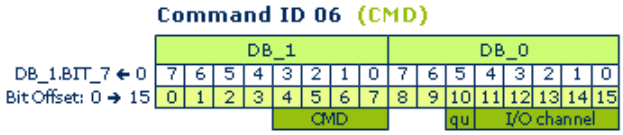


Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x05: ID 05		
8	1	Report measurement	RM		Enum: 0b0: Report measurement: query only 0b1: Report measurement: query / auto reporting		
9	1	Reset measurement	RE		Enum: 0b0: Reset measurement: not active 0b1: Reset measurement: trigger signal		
10	1	Measurement mode	e/p		Enum: 0b0: Energy measurement 0b1: Power measurement		
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: All output channels supported by the device 0x1F: Input channel (from mains supply)		
16	4	Measurement delta to be reported (LSB)	MD_LSB		0...4095	0...4095	N/A
20	1	Not Used (= 0)					
21	3	Unit	UN		Enum: 0x00: Energy [Ws] 0x01: Energy [Wh] 0x02: Energy [KWh] 0x03: Power [W] 0x04: Power [KW] 0x05...0x07: Not used		
24	8	Measurement delta to be reported (MSB)	MD_MSB		0...4095	0...4095	N/A
32	8	Maximum time between two subsequent actuator messages	MAT	Measurement Response messages [10s]	Enum: 1...255: s 10...2550 0: Reserved		
40	8	Minimum time between two subsequent actuator messages	MIT	Measurement Response messages [s]	Enum: 1...255: s 1...255 0: Reserved		

CMD 0x6 - Actuator Measurement Query

This message is sent to an actuator. The actuator replies with an Actuator Measurement Response message.

Response Timing:
An Actuator Message Response message shall be received within a maximum of 300ms from the time of transmission of this message. In case no such response is received within this time frame the action shall be treated as completed without result.

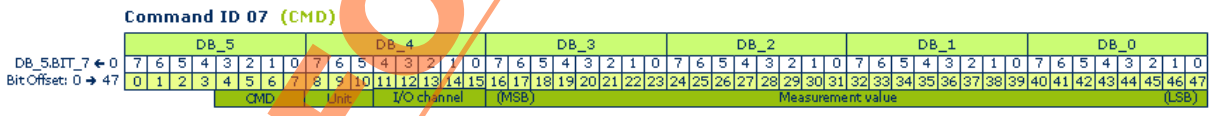


Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	2	Not Used (= 0)					
10	1	Query	qu		Enum: 0b0: Query energy 0b1: Query power		
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: All output channels supported by the device 0x1F: Input channel (from mains supply)		

CMD 0x7 - Actuator Measurement Response

This message is sent by an actuator if one of the following events occurs:
- Measurement results trigger an automated transmission (see Actuator Set Measurement message)
- Message Actuator Measurement Query has been received

Response Timing:
This message shall be sent within a maximum of 50ms from the time of reception of the Actuator Measurement Query message.

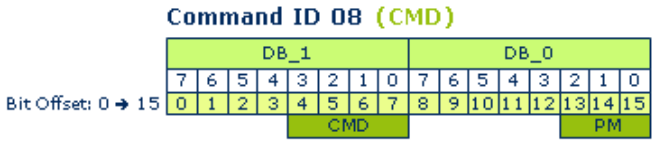


REMARK 1:
In case an Actuator Measurement Query message specifies a parameter that is not supported by the device addressed, such device shall ignore the message and shall not answer using the Actuator Measurement Response message.
REMARK 2:
In case an Actuator Measurement Query message queries all output channels supported by a device being addresses, such device shall answer per each output channel by using an individual Actuator Measurement Response message.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x07: ID 07		
8	3	Unit	UN		Enum: 0x00: Energy [Ws] 0x01: Energy [Wh] 0x02: Energy [KWh] 0x03: Power [W]		

					0x04: Power [KW] 0x05...0x07: Not used		
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: Not applicable, do not use 0x1F: Input channel (from mains supply)		
16	32	Measurement value (4 bytes)	MV	DB3 = MSB / DB0 = LSB	0...4294967295	...	N/A

CMD 0x8 - Actuator Set Pilot Wire Mode

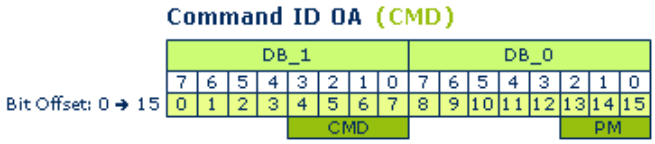


Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x08: ID 08		
8	5	Not Used (= 0)					
13	3	Pilotwire mode	PM		Enum: 0x00: Off 0x01: Comfort 0x02: Eco 0x03: Anti-freeze 0x04: Comfort-1 0x05: Comfort-2		

CMD 0x9 - Actuator Pilot Wire Mode Query

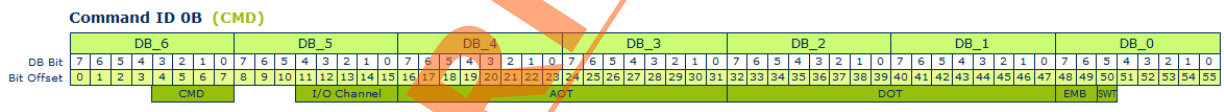
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x09: ID 09		

CMD 0xA - Actuator Pilot Wire Mode Response



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x0A: ID 0A		
8	5	Not Used (= 0)					
13	3	Pilotwire mode	PM		Enum: 0x00: Off 0x01: Comfort 0x02: Eco 0x03: Anti-freeze 0x04: Comfort-1 0x05: Comfort-2		

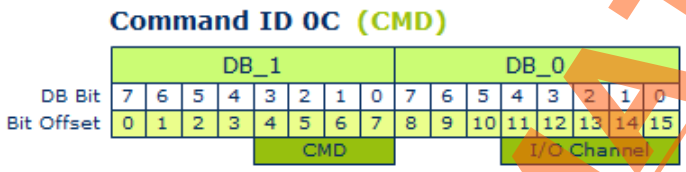
CMD 0xB - Actuator Set External Interface Settings



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x0B: ID 0B		
8	3	Not Used (= 0)					
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: All output channels supported by the device 0x1F: Input channel (from mains supply)		
16	16	Auto OFF Timer	AOT	Timer to automatically set OFF output channel when it is set ON	Enum: 0x0000: Timer deactivated 0x0001...0xFFFE:	0.1...6553.4	s
					0xFFFF: Does not modify saved value		

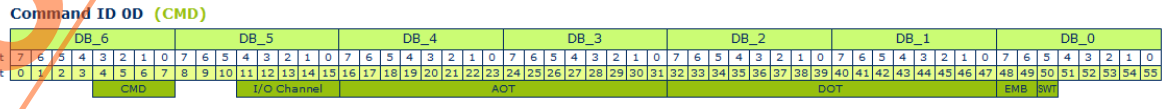
32	16	Delay OFF Timer	DOT	Delay timer before setting output channel to OFF value received by radio cmd	Enum: 0x0000: Timer deactivated 0x0001...0xFFFE: 0.1...6553.4 s 0xFFFF: Does not modify saved value
48	2	External Switch/Push Button	EBM	External interface mode	Enum: 0b00: Not applicable 0b01: External Switch 0b10: External Push Button 0b11: Auto detect
50	1	2-state switch	SWT	Switching state	Enum: 0b00: Change of key state sets ON or OFF 0b01: Specific ON/OFF positions. ON when contacts are closed. OFF when contacts are open.
51	5	Not Used (= 0)			

CMD 0xC - Actuator External Interface Settings Query



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x0C: ID 0C		
8	3	Not Used (= 0)					
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: All output channels supported by the device 0x1F: Input channel (from mains supply)		

CMD 0xD - Actuator External Interface Settings Response



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x0D: ID 0D		
8	3	Not Used (= 0)					
11	5	I/O channel	I/O		Enum: 0x00...0x1D: Output channel (to load) 0x1E: Not applicable 0x1F: Input channel (from mains supply)		
16	16	Auto OFF Timer	AOT	Timer to automatically set OFF output channel when it is set ON	Enum: 0x0000: Timer deactivated 0x0001...0xFFFE:	0.1...6553.4	s
					0xFFFF: Does not modify saved value		
32	16	Delay OFF Timer	DOT	Delay timer before setting output channel to OFF value received by radio cmd	Enum: 0x0000: Timer deactivated 0x0001...0xFFFE:	0.1...6553.4	s
					0xFFFF: Does not modify saved value		
48	2	External Switch/Push Button	EBM	External interface mode	Enum: 0b00: Not applicable 0b01: External Switch 0b10: External Push Button 0b11: Auto detect		
50	1	2-state switch	SWT	Switching state	Enum: 0b00: Change of key state sets ON or OFF 0b01: Specific ON/OFF positions. ON when contacts are closed. OFF when contacts are open.		
51	5	Not Used (= 0)					

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	01	Type 0x01 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	02	Type 0x02 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	03	Type 0x03 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	04	Type 0x04 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	05	Type 0x05 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	06	Type 0x06 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	07	Type 0x07 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	08	Type 0x08 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	09	Type 0x09 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control

TYPE	0A	Type 0x0A (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	0B	Type 0x0B (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	0C	Type 0x0C

Submitter: AVIDSEN

Description
Intended for heating module with Pilotwire command and Energy Measurement.
Pilot wire includes 6 different modes:
- Off
- Comfort
- Eco
- Anti-freeze
- Comfort-1°C
- Comfort-2°C

Data exchange
Direction: bidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: at each state change / every 5 minutes
Trigger event: actuator status change, consumption information change
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: Universal teach-in (UTE)

Security
Encryption supported: no
Security level format: -

Supported command	Type 0x0C
0x1 – Actuator Set Output	X
0x2 – Actuator Set Local	X
0x3 – Actuator Status Query	X
0x4 – Actuator Status Response	X
0x5 – Actuator Set Measurement	X
0x6 – Actuator Measurement Query	X
0x7 – Actuator Measurement Response	X
0x8 – Actuator Set Pilot Wire Mode	X
0x9 – Actuator Pilot Wire Mode Query	X
0xA – Actuator Pilot Wire Mode Response	X

Telegram Definition
The telegrams corresponding to Command IDs: 0x1, 0x2, 0x3, 0x4, 0x5, 0x6 and 0x7 are already defined in EEP V2.6.2 and do not change.

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	0D	Type 0x0D

Submitter: ID-RF

Description for TYPE 0x0D, 0x0E, 0x0F, 0x12

Add three commands:
- CMD 0xB – Actuator Set External Interface Settings
- CMD 0xC – Actuator External Interface Settings Query
- CMD 0xD – Actuator External Interface Settings Response

Supported functions:
- External Switch/Push Button Control
- External Switch/Push Button Type (Bi-stable or Mono-stable / 2-state switch)
- Auto OFF Timer
- Delay OFF Timer

Add D2-01-0D profile – Micro smart plug with 1 channel, no metering capabilities
Add D2-01-0E profile – Micro smart plug with 1 channel, and metering capabilities
Add D2-01-0F profile – Slot-in module with 1 channel, no metering capabilities
Add D2-01-12 profile – Slot-in module with 2 channels, no metering capabilities

These new profiles are modifications of the existing ones, please find below a listing:
- Profile D2-01-0D is all same as D2-01-0A but with one modification
- Profile D2-01-0E is all same as D2-01-0B but with one modification
- Profiles D2-01-0F is all same as D2-01-0A but with three modifications
- Profiles D2-01-12 is all same as D2-01-0A but with four modifications

Description of new supported functions

External Switch / Push Button Control

As for "Local Control" function, it indicates if the product can be controlled using an additional physical interface, as an external push button or wall switch. This interface is not directly integrated to the product, but can be connected using wires.

External Switch / Push Button Type

- Bi-stable or Mono-stable:
  External interface can be composed of bi-stable button (switch) or mono-stable button (push button). Depending of the type selected, the product will have different reactions when switch/push button actions are detected.
  - If bi-stable button type selected, each change of state (open or close) toggle the output.
  - If mono-stable button type selected, first change of state (open or close) toggle the output, second change (close or open) is ignored, and output remains unchanged.
  NOTE: If the product has more than one output, the external interface type is applied for all outputs.

- 2-state switch:
  This parameter is effective only if external switch/push button type is set as "bi-stable". When this setting is enabled, the device will turn ON output(s) when contacts are closed and turn OFF output(s) when contacts are open. When this setting is disabled (default mode), a change of contacts state will toggle the output(s).

Auto OFF Timer
This functions turns OFF the output when time elapsed.
Use case: In corridor, when you turn ON the light, you want it to be turned OFF automatically after a certain time.

Delay OFF Timer
When the device receives a valid radio command, setting an output state to OFF, instead of setting immediately the new output state, this function set the new output state when time elapsed.
Use Case: In hotel room, when you send a radio command (removing card from card switch) to turn OFF the light, instead, turn OFF light after a certain time, to allow people to leave the room.

The addition of these functions required three new commands:
- CMD 0xB – Actuator Set External Interface Settings
- CMD 0xC – Actuator External Interface Settings Query
- CMD 0xD – Actuator External Interface Settings Response

Data exchange
Direction: bidirectional
Addressing: broadcast

Communication trigger: event triggered
Communication interval: no fix interval
Trigger event: actuator status change, consumption information
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: Universal teach-in (UTE)

Security
Encryption supported: no
Security level format: -

Supported command	Type 0x0D	Type 0x0E	Type 0x0F	Type 0x12
0x1 – Actuator Set Output	X	X	X	X
0x2 – Actuator Set Local	X	X	X	X
0x3 – Actuator Status Query	X	X	X	X
0x4 – Actuator Status Response	X	X	X	X
0x5 – Actuator Set Measurement	-	X	-	-
0x6 – Actuator Measurement Query	-	X	-	-
0x7 – Actuator Measurement Response	-	X	-	-
0x8 – Actuator Set Pilot Wire Mode	-	-	-	-
0x9 – Actuator Pilot Wire Mode Query	-	-	-	-
0xA – Actuator Pilot Wire Mode Response	-	-	-	-
0xB – Actuator Set External Interface Settings	-	-	X	X
0xC – Actuator External Interface Settings Query	-	-	X	X
0xD – Actuator External Interface Settings Response	-	-	X	X

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	0E	Type 0x0E (description: see table)

Submitter: ID-RF

Description see TYPE 0x0D

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	0F	Type 0x0F (description: see table)

Submitter: ID-RF

Description see TYPE 0x0D

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	10	Type 0x10 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	11	Type 0x11 (description: see table)

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	12	Type 0x12 (description: see table)

Submitter: ID-RF

Description see TYPE 0x0D

See profile: D2-01-00

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	13	Type 0x13 (description: see table)

Submitter: AWAG Elektrotechnik AG

See profile: D2-01-01

RORG	D2	VLD Telegram
FUNC	01	Electronic switches and dimmers with Energy Measurement and Local Control
TYPE	14	Type 0x14 (description: see table)

Submitter: AWAG Elektrotechnik AG

See profile: D2-01-01

D2-02: Sensors for Temperature, Illumination, Occupancy And Smoke

This EEP family shall be used for bidirectional sensors that measure temperature, illumination, and detect room occupancy and smoke presence.

The EEP may be used in conjunction with the Smart Acknowledge protocol.

For teach-in and teach-out the "Universal Uni- and Bidirectional Teach-In Procedure for EEP based Communication" shall be used. Alternatively the Smart Acknowledge Teach-In Procedure is used for those sensors supporting Smart Acknowledge.

Supported function	Type 0x00	Type 0x01	Type 0x02
Temperature Sensor	X	X	X
Illumination Sensor	X	X	-
Occupancy Detector	X	-	-
Smoke Detector	X	X	X

RORG	D2	VLD Telegram
FUNC	02	Sensors for Temperature, Illumination, Occupancy And Smoke
TYPE	00	Type 0x00

Submitter: MSR-Office

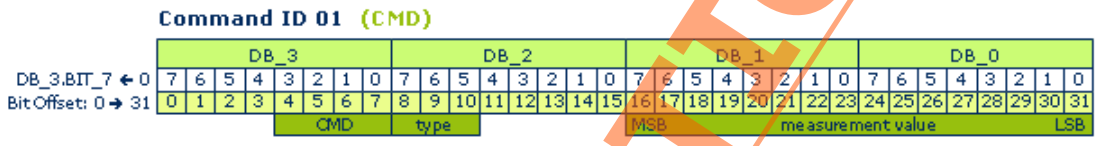
CMD 0x1 - Sensor Measurement

This message is sent by a sensor if one of the following events occurs:

- Measurement results trigger an automated transmission (see Actuator Set Measurement message)

- Message Actuator Measurement Query has been received

Response Timing: None

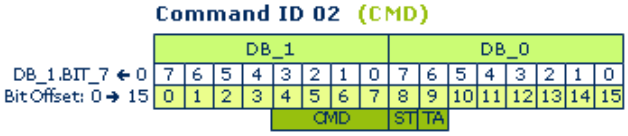


Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	command identifier	Enum: 0x01: ID 01		
8	3	Measurement type	type		Enum: 0x00: Temperature (0…65535: -40 to +120°C) 0x01: Illumination (0…65535: 0 to 2047lx) 0x02: Occupancy (0: not detected; 1: detected) 0x03: Smoke The following content applies for the value in DB_0 and DB_1: 0x00 - No smoke detected 0x01 - Smoke detected via ionization chamber 0x02 - Smoke detected via optical chamber 0x03 - Smoke detected via both chambers		
11	5	Not Used (= 0)					
16	16	Measurement value (2 bytes)	MV	DB_0 = LSB / DB_1 = MSB	0...65535	...	N/A

CMD 0x2 - Sensor Test/Trigger

This message is sent to a sensor. It causes the sensor to enter self-test mode or trigger an alarm (if supported).

Response Timing: None



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x02: ID 02		
8	1	Self-test	ST		Enum: 0b0: Self-test mode 0b1: Normal operation		
9	1	Trigger alarm	TA		Enum: 0b0: Trigger alarm 0b1: Normal operation		
10	6	Not Used (= 0)					

CMD 0x3 - Actuator Set Measurement

This message is sent to a sensor. It configures the measurement behaviour of the sensor.

Response Timing: None

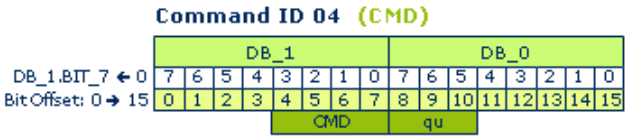
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x03: ID 03		
8	1	Report measurement	RM		Enum: 0b0: Report measurement: query only 0b1: Report measurement: query / auto reporting		
9	7	Not Used (= 0)					
16	4	Measurement delta to be reported (LSB)	MD_LSB		0...4095	0...4095	N/A
20	1	Not Used (= 0)					
21	3	Unit	UN		Enum: 0x00: Temperature (°C) 0x01: Illumination (lx) 0x02...0x07: Not used		
24	8	Measurement delta to be reported (MSB)	MD_MSB		0...4095	0...4095	N/A

32	8	Maximum time between two subsequent Actuator	MAT	Measurement Response messages [10s]	0...255	10...2550	s
40	8	Minimum time between two subsequent Actuator	MIT	Measurement Response messages [s]	0...255	0...255	s

CMD 0x4 - Sensor Measurement Query

This message is sent to a sensor. The sensor replies with an Sensor Measurement message.

Response Timing:
A Sensor Measurement message shall be received within a maximum of 300ms from the time of transmission of this message.
In case no such response is received within this time frame the action shall be treated as completed without result.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x04: ID 04		
8	3	Query	qu		Enum: 0x0: Query temperature; 0x1: Query illumination; 0x2: Query occupancy; 0x3: Query smoke; 0x4...0x7: Not used		
11	5	Not Used (= 0)					

RORG	D2	VLD Telegram
FUNC	02	Sensors for Temperature, Illumination, Occupancy And Smoke
TYPE	01	Type 0x01 (description: see table)

See profile: D2-02-00

RORG	D2	VLD Telegram
FUNC	02	Sensors for Temperature, Illumination, Occupancy And Smoke
TYPE	02	Type 0x02 (description: see table)

See profile: D2-02-00

D2-03: Light, Switching + Blind Control

The EEP family D2-03-xx provides different telegram types for switches, light and blind control. The purpose is to support secure communication and other functional aspects of applications extending the possibilities given by

existing profiles (1BS, RPS, 4BS). Transmitting information in the status field of a telegram is not necessary with this EEP family.

RORG	D2	VLD Telegram
FUNC	03	Light, Switching + Blind Control
TYPE	00	Type 0x00

Submitter: EnOcean GmbH

EEP Properties:
DATA EXCHANGE
Direction: unidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: N/A
Trigger event: N/A
Tx delay: N/A
Rx timeout : N/A

TEACH-IN
Teach-in method: Universal teach-in (UTE) + Secure Teach-in (for secure communication)

SECURITY
Encryption supported: yes

EEP Family Table:

Supported function	Type 00
2 Rocker Switch	X

The encrypted telegram has the R-ORG 0x30. The payload (4 bits) is encrypted. That telegram can be repeated. After decryption and the authentication of the CMAC, the telegram turns into a non-encrypted EnOcean telegram with the R-ORG 0x32. The payload will be expanded to 8 bits (4 MSB set to zero) and can then be interpreted as described in the telegram definition table.

The decrypted telegram may not be repeated as the information is not secure anymore. The following table provides information about the conversion between the profiles D2-03-00 and F6-02-01:

D2-03-00 DATA	F6-02-01 DATA	F6-02-01 STATUS
0...4	-	-
5	0x17	0x30
6	0x70	0x20
7	0x37	0x30
8	0x10	0x20
9	0x15	0x30
10	0x35	0x30
11	0x50	0x30
12	0x70	0x30
13	0x10	0x30
14	0x30	0x30
15	bxxx0xxxx	0x20

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Rocker Information	RI2	Information about pressed rockers (similar to RPS profiles)	Enum: 0...4: Reserved 5: Button A1 + B0 pressed, energy bow pressed 6: 3 or 4 buttons pressed, energy bow pressed 7: Button A0 + B0 pressed, energy bow pressed		

					8: No buttons pressed, energy bow pressed 9: Button A1 + B1 pressed, energy bow pressed 10: Button A0 + B1 pressed, energy bow pressed 11: Button B1 pressed, energy bow pressed 12: Button B0 pressed, energy bow pressed 13: Button A1 pressed, energy bow pressed 14: Button A0 pressed, energy bow pressed 15: Energy bow released

RORG	D2	VLD Telegram
FUNC	03	Light, Switching + Blind Control
TYPE	10	Mechanical Handle

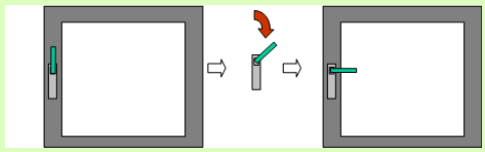
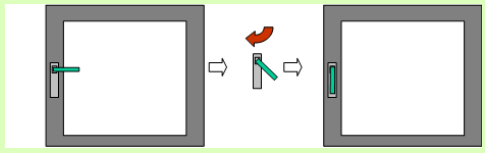
Submitter: Eltako

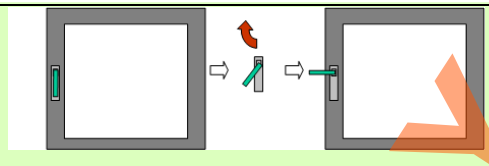
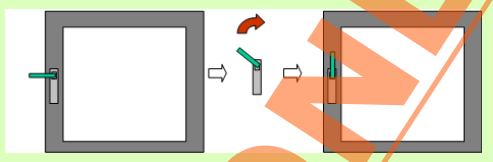
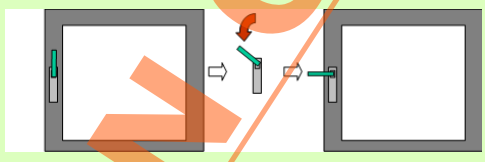
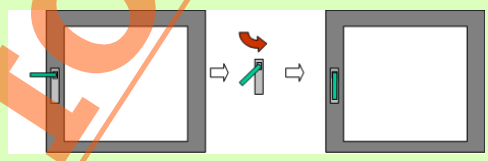
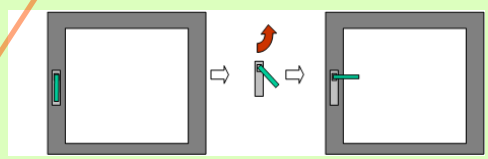
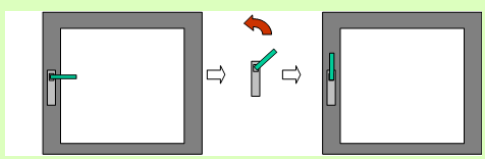
This document contains the description of decrypted mechanical handle data. The mechanical handle profile must be redefined because there is no status field in EnOcean security available.

EEP Properties:
DATA EXCHANGE
Direction: unidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: N/A
Trigger event: rotate mechanical handle
Tx delay: N/A
Rx timeout: N/A

TEACH-IN
Teach-in method: Secure Teach-in, followed by special RPS teach-in sequence: Mechanical handle (closed => opened => closed within 2s)

SECURITY
Encryption supported: yes
Security level format:

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Window handle, decrypted data	WIN	Movement of the window handle	Enum: 0b00000001:  0b00000010:  0b00000011:		

				
				0b00000100: 
				0b00000011: 
				0b00000010: 
				0b00000011: 
				0b00000100: 

RORG	D2	VLD Telegram
FUNC	03	Light, Switching + Blind Control
TYPE	20	Beacon with Vibration Detection

Submitter: Star Micronics Co., LTD.

Description
This profile is defined for the use in beacon devices. Such devices transmit if the telegram was triggered by a vibration or the timer.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: -
Trigger event: Vibration (movement), timer
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: N/A

Security
Encryption supported: no
Security level format: -

Appendix
This beacon device can send a radio telegram at a prescribed timing. The receiver can detect the beacon device with this transmission. This device, when attached to a human body, can also be made into a wide variety of beacon-based systems, which keep people within the safe area, or keep them out of the danger zone.

This device can replace a battery with a vibration power generator. The beacon device harvests power from human walking motion and activates the radio transmitter circuit; it does not require batteries of any kind, enabling maintenance-free operation in many applications.

The product to be immediately released comes with no switches, and the future product, to follow soon, will be equipped with pushbuttons for wider application possibilities.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Energy Supply	ES	Defines the energy source for the transmission	Enum: 0: Battery supply 1: Vibration generator supply		
1	7	Not Used (= 0)					

D2-04: CO2, Humidity, Temperature, Day/Night and Autonomy

CO2 sensor with 8 bits resolution (0 – 2000ppm or 0-5000ppm range) 8 bits temperature and relative humidity with Day / Night and battery autonomy.

Day / Night is based on illumination not on clock

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: time-triggered
Communication interval: According to remaining autonomy and day or night
Trigger event: heartbeat, …
Teach-in method: Universal teach-in, Smart Ack
Encryption required: no
Security level format: 0

EEP Family Table
Each TYPE has to support every parameter that is marked in its column!

TYPE	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x10	0x1A	0x1B	0x1C	0x1D	0x1E
CO2 Sensor 0-2000 ppm range	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
CO2 Sensor 0-5000 ppm range	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X
Humidity Sensor	X	X	-	-	-	-	-	-	X	X	-	-	-	-	-	-
Temperature Sensor	X	-	X	X	X	X	-	-	X	-	X	X	X	X	-	-
Day/Night Sensor	X	X	X	-	-	X	X	X	X	X	X	-	-	X	X	X
Battery Autonomy	X	X	X	X	-	-	-	X	X	X	X	X	-	-	-	X

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	00	Type 0x00

Submitter: NanoSense

The manufacturer will indicate emission rates versus battery autonomy and day night status.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	CO2	CO2	Concentration (linear), 1 LSB = 7.84 ppm Or Concentration (linear), 1 LSB = 19.6 ppm	0...255	0...2000 (or 5000)	ppm
8	8	Humidity	HUM	Rel. Humidity (linear), 1 LSB = 0.5 %	0...200	0...100	%
16	8	Temperature	TMP	Temperature (linear), 1 LSB = 0.2 °C	0...255	0...+51	°C
24	1	Day/Night	DN	...	Enum: 0: Day 1: Night		
25	3	Battery autonomy	BA	Battery autonomy	Enum: 0: 100 - 87.5 % 1: 87.5 - 75 % 2: 75 - 62.5 % 3: 62.5 - 50 % 4: 50 - 37.5 % 5: 37.5 - 25 % 6: 25 - 12.5 % 7: 12.5 - 0 %		
28	4	Not Used (= 0)					

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	01	Type 0x01 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	02	Type 0x02 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	03	Type 0x03 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	04	Type 0x04 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	05	Type 0x05 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	06	Type 0x06 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	07	Type 0x07 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	08	Type 0x08 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	09	Type 0x09 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	10	Type 0x10 (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	1A	Type 0x1A (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	1B	Type 0x1B (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	1C	Type 0x1C (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	1D	Type 0x1D (description: see table)

See profile: D2-04-00

RORG	D2	VLD Telegram
FUNC	04	CO2, Humidity, Temperature, Day/Night and Autonomy
TYPE	1E	Type 0x1E (description: see table)

See profile: D2-04-00

D2-05: Blinds Control for Position and Angle

Submitter: AWAG Elektrotechnik AG

Description
The protocol is intended for commissioning as well as for operation of a blind actuator that supports control of the vertical position as well as the rotation angle of the slats.

Data exchange
Direction: bidirectional
Addressing: unicast (ADT) & broadcast
Communication trigger: event-triggered or upon query
Communication interval: TYPE 00,01: heartbeat (off or 30 s or 3 min), TYPE 02: event-triggered

Trigger event TYPE 00,01:
a) status change (alarm, blockage, deblockage)
b) position change > 10 % of range
c) end position reached (0% or 100%)
d) heartbeat
Trigger event TYPE 02:
request, manual change (position, angle)

Tx delay: n/a
Rx timeout: n/a

Teach-in
Teach-in method: Universal teach-in

Security
Encryption supported: no

Security level format: n/a

EEP Family Table
Each TYPE has to support all telegrams and parameters marked in its column.

Command Overview	Type 0x00	Type 0x01	Type 0x02
No. of output channels	1	4	1
Go to Position and Angle	X	X	X
Stop	X	X	X
Query Position and Angle	X	X	X
Reply Position and Angle	X	X	X
Set parameters	X	X	-

Parameter Overview	Type 0x00	Type 0x01	Type 0x02
Vertical position	X	X	X
Rotation angle	X	X	X
Repositioning	X	X	X
Blockage mode	X	X	X
Alarm mode	X	X	-
Set vertical, 5 sec ... 5 min	X	X	-
Set rotation, 0 ... 2.54 sec	X	X	-
Set Alarm Action	X	X	-

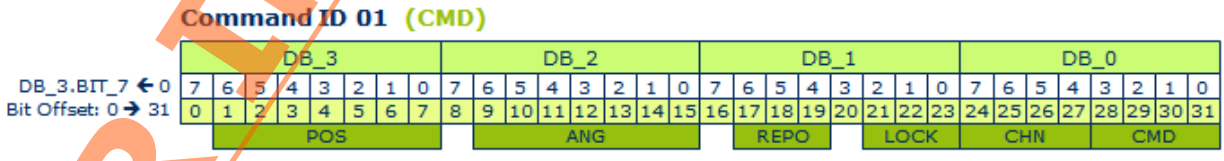
RORG	D2	VLD Telegram
FUNC	05	Blinds Control for Position and Angle
TYPE	00	Type 0x00

Submitter: AWAG Elektrotechnik AG

CMD 1 - Go to Position and Angle

Once the actuator is configured either by the "Set Parameters" command or through manual configuration (using local buttons) the position of the blinds can be controlled with this command.
When the actuator is set to "blockage" mode, neither local nor central positioning and configuration commands will be executed. This mode is intended for putting the device temporarily out of service, e.g. for a maintenance operation.
When the actuator is set to the "alarm" mode neither local nor central positioning and configuration commands will be executed. Before entering the "alarm" mode, the actuator will execute the "alarm action" as configured by the "Set parameter" command.
When this command is sent with the "deblockage" option, the actuator terminates the "alarm" or "blockage" mode and enters the normal mode.

Exemplary illustration of data bytes 0 ... 3:



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	7	Position	POS	Vertical position	Enum: 0...100:	 0...100	 %

					127: Do not change
8	1	Not Used (= 0)			
9	7	Angle	ANG	Rotation angle	Enum: 0...100: 0...100 % 127: Do not change
16	1	Not Used (= 0)			
17	3	Repositioning	REPO	How to adjust the internal positioning tracker before going to the new position	Enum: 0: Go directly to POS/ANG 1: Go up (0%), then to POS/ANG 2: Go down (100%), then to POS/ANG 3 ... 7: Reserved
20	1	Not Used (= 0)			
21	3	Locking modes	LOCK	Set/reset locking modes	Enum: 0: Do not change 1: Set blockage mode 2: Set alarm mode 3 ... 6: Reserved 7: Deblockage
24	4	Channel	CHN	Channel address	Enum: 0: Channel 1 1: Channel 2 2: Channel 3 3: Channel 4 15: All channels
28	4	Command ID	CMD	Command identifier	Enum: 1: Goto command

CMD 2 - Stop

This command immediately stops a running blind motor. It has no effect when the actuator is in “blockage” or “alarm” mode, i.e. it will not stop an eventual “go up” or “go down” alarm action.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Channel	CHN	Channel address	Enum: 0: Channel 1 1: Channel 2 2: Channel 3 3: Channel 4 15: All channels		
4	4	Command ID	CMD	Command identifier	Enum: 2: Stop command		

CMD 3 - Query Position and Angle

This command requests the actuator to return a “reply” command.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Channel	CHN	Channel address	Enum: 0: Channel 1 1: Channel 2 2: Channel 3 3: Channel 4		

					15: All channels
4	4	Command ID	CMD	Command identifier	Enum: 3: Query command

CMD 4 - Reply Position and Angle

Either upon request ("Query" command) or after an internal trigger (see EEP Properties) the actuator sends this command to inform about its current state.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	7	Position	POS	Current vertical position	Enum: 0...100: 0...100 % 127: Position unknown, will be known after the next goto cmd		
8	1	Not Used (= 0)					
9	7	Angle	ANG	Current rotation angle	Enum: 0...100: % 0...100 127: Angle unknown, will be known after the next goto cmd		
16	5	Not Used (= 0)					
21	3	Locking modes	LOCK	Current locking mode	Enum: 0: Normal (no lock) 1: Blockage mode 2: Alarm mode 3 ... 7: Reserved		
24	4	Channel	CHN	Channel address	Enum: 0: Channel 1 1: Channel 2 2: Channel 3 3: Channel 4		
28	4	Command ID	CMD	Command identifier	Enum: 4: Reply command		

CMD 5 - Set parameters

This command sets one or multiple configuration parameters of the actuator. When a parameter value is set to "-> no change" this parameter will not be modified. The VERT and ROT parameters describe the duration needed by the motor for a full run of the blind, or for a complete turn of the slats, respectively. They have to be measured on site and assigned to the actuator.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	15	Set vertical	VERT	Measured duration of a vertical run	Enum: 500...30000: 5000...300000 ms 0 ... 499: Reserved 32767 (0x7FFF): -> No change		
16	8	Set rotation	ROT	Measured duration of rotation	Enum: 1...254: ms 10...2540 0: No rotation 255: -> No change		
24	5	Not Used (= 0)					

29	3	Set alarm action	AA	Besides locking all other commands entering the alarm mode results in	Enum: 0: No action 1: Immediate stop 2: Go up (0%) 3: Go down (100%) 4 ... 6: Reserved 7: -> No change
32	4	Channel	CHN	Channel address	Enum: 0: Channel 1 1: Channel 2 2: Channel 3 3: Channel 4 15: All channels
36	4	Command ID	CMD	Command identifier	Enum: 5: Set parameters command

RORG	D2	VLD Telegram
FUNC	05	Blinds Control for Position and Angle
TYPE	01	Type 0x01 (description: see table)

Submitter: AWAG Elektrotechnik AG

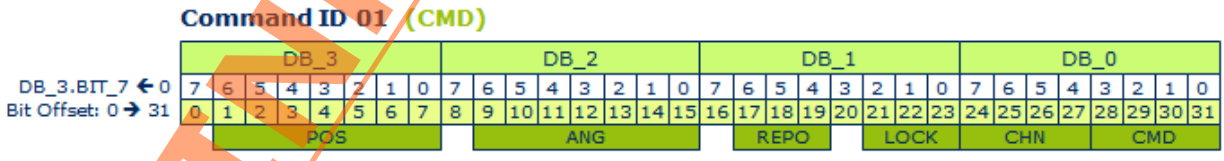
See profile: D2-05-00

RORG	D2	VLD Telegram
FUNC	05	Blinds Control for Position and Angle
TYPE	02	Type 0x02

Submitter: ViCOS GmbH

CMD 1 - Go to Position and Angle

Exemplary illustration of data bytes 0 ... 3:



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	7	Position	POS	Vertical position	Enum: 0...100: 0...100 127: Do not change		%
8	1	Not Used (= 0)					

9	7	Angle	ANG	Rotation angle	Enum: 0...100: 0...100 % 127: Do not change
16	1	Not Used (= 0)			
17	3	Repositioning	REPO	How to adjust the internal positioning tracker before going to the new position	Enum: 0: Go directly to POS/ANG 1: Go up (0%), then to POS/ANG 2: Go down (100%), then to POS/ANG 3...7: Reserved
20	1	Not Used (= 0)			
21	3	Locking mode	LOCK	Set/reset locking mode	Enum: 0: Do not change 1: Set blockage mode 2...6: Reserved 7: Deblockage
24	4	Channel	CHN	Channel address	Enum: 0: Channel 1 2...6: Reserved
28	4	Command ID	CMD	Command identifier	Enum: 1: Goto command

CMD 2 - Stop

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Channel	CHN	Channel address	Enum: 0: Channel 1		
4	4	Command ID	CMD	Command identifier	Enum: 2: Stop command		

CMD 3 - Query Position and Angle

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Channel	CHN	Channel address	Enum: 0: Channel 1		
4	4	Command ID	CMD	Command identifier	Enum: 3: Query command		

CMD 4 - Reply Position and Angle

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	7	Position	POS	Current vertical position	Enum: 0...100: 0...100 % 127: Position unknown, will be known after the next goto cmd		
8	1	Not Used (= 0)					

9	7	Angle	ANG	Current rotation angle	Enum: 0...100: % 0...100 127: Angle unknown, will be known after the next goto cmd
16	5	Not Used (= 0)			
21	3	Locking mode	LOCK	Set/reset locking mode	Enum: 0: Normal (no lock) 1: Blockage mode 2...7: Reserved
24	4	Channel	CHN	Channel address	Enum: 0: Channel 1 1...15: Reserved
28	4	Command ID	CMD	Command identifier	Enum: 4: Reply command

D2-06: Multisensor Window Handle

EEP Family Table

Each TYPE has to support all telegrams and parameters marked in its column.

Message	Type 01
Message Type 0x00 Sensor Values	X
Message Type 0x10 Configuration Report	X
Message Type 0x20 Log Data 01	X
Message Type 0x21 Log Data 02	X
Message Type 0x22 Log Data 03	X
Message Type 0x23 Log Data 04	X
Message Type 0x80 Control and Settings	X

The list of parameters could be structured following the features that always include a certain group of parameters.

RORG	D2	**VLD Telegram**
FUNC	06	Multisensor Window Handle
TYPE	01	Alarm, Position Sensor, Vacation Mode, Optional Sensors

Submitter: SODA GmbH

Data exchange
Direction: bidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: Time-Triggered: Default is 20 Minutes; Event-Triggered
Trigger event: Alarm, Handle Movement, Window Movement, Button Presses
Tx delay: 500 ms
Rx timeout: 100 ms

Teach-in
Teach-in method: Universal teach-in (UTE)

Security
Encryption supported: no
Security level format: -

Product Description

The device represented by this EEP is a "Multi-Sensor Window Handle with Alarm Functionality". It is powered by two 1.5V AA batteries.

It can be equipped with the following set of features:
- Alarm Sensor
- Handle Position Sensor
- Window Position Sensor

- Two General Purpose Buttons
- Temperature Sensor
- Humidity Sensor
- Illumination Sensor
- Motion Sensor
- Vacation Mode
- Battery Level Measurement
- Buzzer
- Two LEDs

Details to all features are listed below.

For pairing the bidirectional UTE method is used.

The device transmits the actual sensor values periodically (dDefault: 20 minutes) or on an event like "Handle Movement" or "Alarm".

After each transmission of a packet the radio part of the handle is in receive mode for a certain amount of time (default: 500 ms) and accepts then messages from a paired Controller/Gateway/… . For normal operation it is not necessary to send data to the handle. It is just needed to make some configurations, get log data or control some parts of the handle.

Because it is possible to have all possible permutations of the handle features out in the market, the EEP approach presented in this document is used. The variety of handle-products with different equipped features does not fit well to the EEP family approach preferred in the EnOcean world.

Feature Description
The handle may have all or a subset of the features described here. If a feature is not available (e.g. the sensor is not equipped), then this will be marked in the radio telegram (see detailed tables below).

Burglary Alarm Sensor
The handle can detect if someone tries to commit burglary on the window the handle is mounted on. The Burglary Alarm Sensor is automatically enabled/disabled each time the window is closed/opened. If an alarm is detected, a radio packet is send with "Burglary Alarm Triggered" flag set and (if handle is equipped with a buzzer) a local alarm sound is generated by the internal buzzer for a certain amount of time (180 s). During the alarm time a repeated "Burglary Alarm On" is send every 15 seconds + Random Offset (0…7 seconds).

Protection Plus Alarm Sensor
Protection Plus is a feature, which generates an alarm every time the handle is moved. Due to security reasons, the detailed documentation about this feature is available from SODA GmbH only under NDA.

Handle Position
The position of the handle is detected and transmitted on every change.

Window Position
It is possible to detect if the window is tilted or not tilted. A packet is send on every change.

General Purpose Buttons
There are two buttons on the handle which can be used as general purpose buttons to control blinds/shutters, lights, etc.
A packet is send when a button is pressed and again when it is released.

Temperature Sensor, Humidity Sensor, Brightness Sensor
The environmental sensors are updated periodically (adjustable, default: 20 minutes) and after this a packet with the updated values is send.

Motion Sensor
The handle can be equipped with a PIR Motion sensor which triggers a packet every time a motion change is detected.

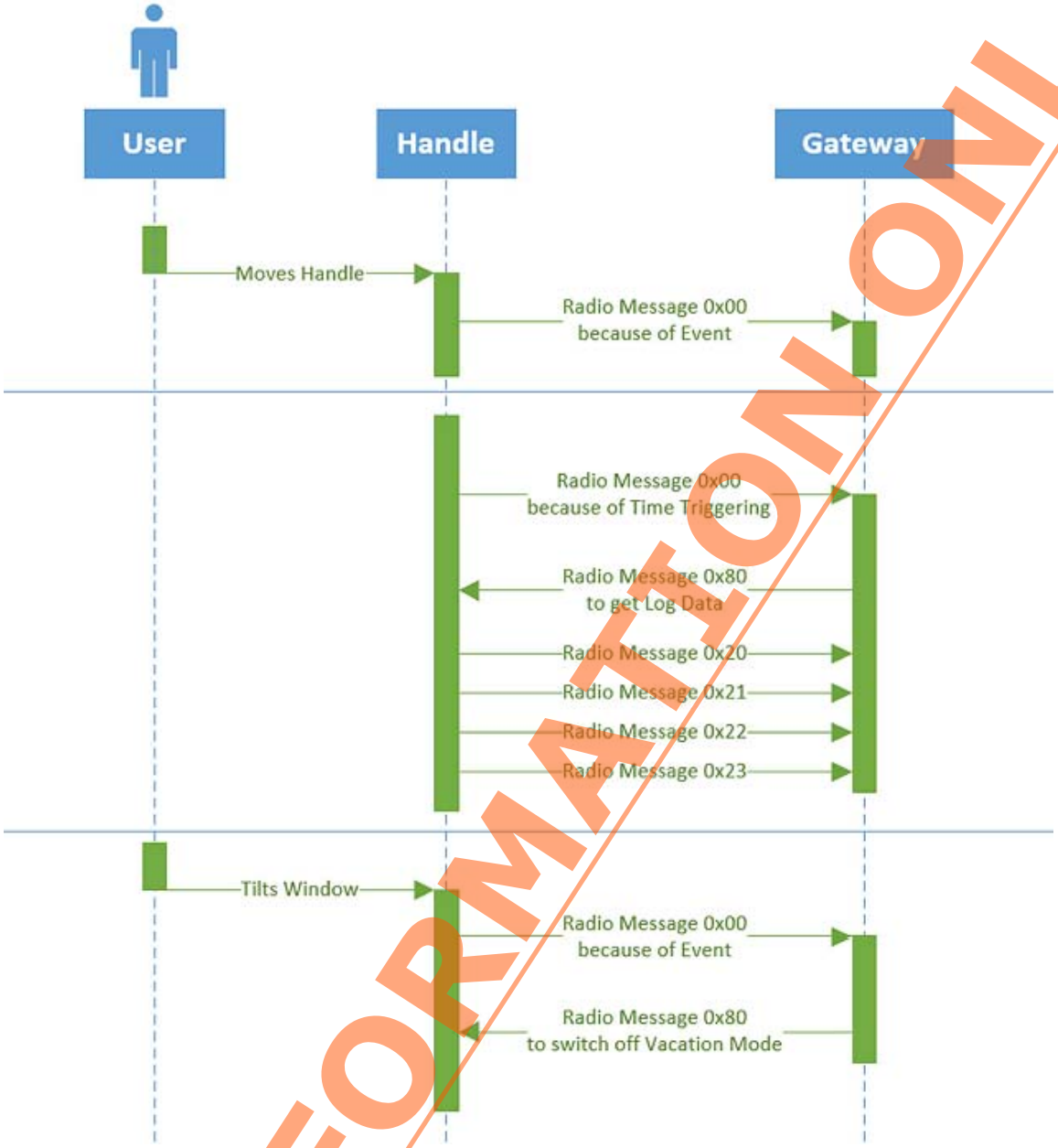
Vacation Mode
If the Vacation Mode is enabled, the red LEDs on the sides of the handle light up every few seconds. This signalizes that the alarm monitoring is active and should be daunting for potential burglars.
The Vacation Mode can be enabled/disabled by a radio command or by a button press locally on the handle. If it is activated locally, a radio packet is sent out to signalize the change to a paired gateway.

Battery Monitor
The handle monitors its battery level and transmits the state of the battery.

Battery Low Click
If enabled, the handle also makes some click noises when the battery level is critical.

Handle Closed Click
The handle generates a click sound every time the handle is closed (put in downward position). This signalizes the activation of the alarm monitoring and gives an acoustic feedback to the user. This click sound can be enabled or disabled by a radio command.

Communication Example



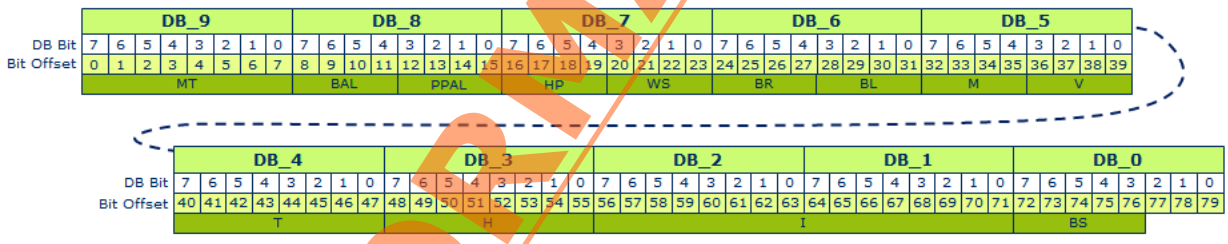
Telegram Definition

The device uses different types of messages for bidirectional communication. The MSB of the VLD payload defines the type of message as shown below in the first table. The different message types are listed in the second table. A detailed description of each message type is then followed in separate tables.

RORG	Payload		Sender ID	Status	CRC8
D2	**Message Type** (MT) 1 Byte	Content of Message as described below 0 ... 13 Bytes	4 Bytes	1 Byte	1 Byte

Message Type	Message Type Description	Encoding	Receive/Transmit
Sensor Values	Standard package which contains the actual values of the integrated sensors.	0x00	Transmit
Configuration Report	There are some settings which can be influenced by the user. This package is send on request and contains the actual settings.	0x10	Transmit
Log Data 01	Some Log Data which can be read from the handle upon request.	0x20	Transmit
Log Data 02	Log Data Packet 02	0x21	Transmit
Log Data 03	Log Data Packet 03	0x22	Transmit
Log Data 04	Log Data Packet 04	0x23	Transmit
Control and Settings	This package can be send to handle to trigger some actions.	0x80	Receive

Message Type 0x00: Sensor Values

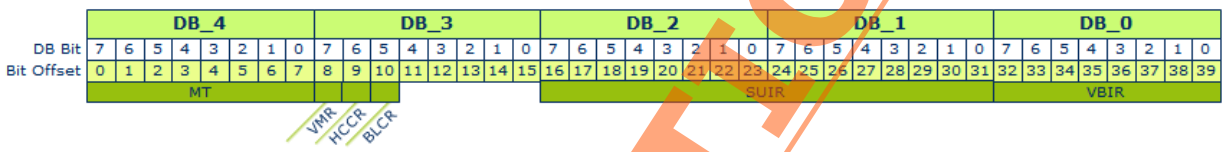


Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Message Type	MT	Descriptor of this message	Enum: 0x00: Message Type Sensor Values		
8	4	Burglary Alarm	BAL	Burglary Alarm Trigger Signal	Enum: 0x0: Burglary Alarm Not Triggered 0x1: Burglary Alarm Triggered 0x2...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported		
12	4	Protection Plus Alarm	PPAL	Protection Plus Alarm Trigger Signal	Enum: 0x0: Protection Plus Alarm Not Triggered 0x1: Protection Plus Alarm Triggered 0x2...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported		

16	4	Handle Position	HP	Position of Handle	Enum: 0x0: Handle Position Undefined 0x1: Handle Up 0x2: Handle Down 0x3: Handle Left 0x4: Handle Right 0x5...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported
20	4	Window State	WS	State of Window	Enum: 0x0: Window State Undefined 0x1: Window Not Tilted 0x2: Window Tilted 0x3...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported
24	4	Button Right	BR	Button Right Activities	Enum: 0x0: No Change 0x1: Button Pressed 0x2: Button Released 0x3...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported
28	4	Button Left	BL	Button Left Activities	Enum: 0x0: No Change 0x1: Button Pressed 0x2: Button Released 0x3...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported
32	4	Motion	M	Motion sensing like typical PIR sensors	Enum: 0x0: Motion Not Triggered 0x1: Motion Triggered 0x2...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported
36	4	Vacation Mode	V	If Vacation Mode is active, the LEDs of the handle light up every few seconds. Vacation Mode can be activated remotely by a radio command or locally by a button press at the handle	Enum: 0x0: No Change 0x1: Vacation Mode Locally Switched On 0x2: Vacation Mode Locally Switched Off 0x3...0xD: Reserved 0xE: Supported + Invalid 0xF: Not Supported
40	8	Temperature	T	Measurement of Temperature in linear 0.32 °C steps	Enum: 0...250: -20...+60 °C 251...253: Reserved 254: Supported + Invalid 255: Not Supported
48	8	Humidity	H	Measurement of Relative Humidity in linear 0.5 % steps	Enum: 0...200: 0...100 % 201...253: Reserved 254: Supported + Invalid 255: Not Supported

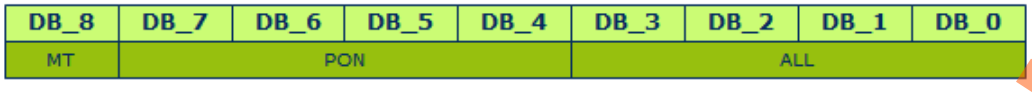
56	16	Illumination	I	Illumination linear in 1 lx steps	Enum: 0...60000: 0...60000 lx 60001: Over Range 60002...65533: Reserved 65534: Supported + Invalid 65535: Not Supported
72	5	Battery State	BS	State of the battery charge in 5 % steps	Enum: 0...20: 0...100 % 21...31: Reserved
77	3	Not Used (= 0)			

Message Type 0x10: Configuration Report



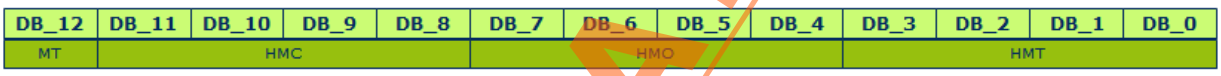
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Message Type	MT	Descriptor of this message	Enum: 0x10: Message Type Configuration Report		
8	1	Vacation Mode	VMR	Status of Vacation Mode	Enum: 0x0: Vacation Mode is Off 0x1: Vacation Mode is On		
9	1	Handle Closed Click	HCCR	Status of Handle Closed Click Feature	Enum: 0x0: Handle Closed Click Feature is Disabled 0x1: Handle Closed Click Feature is Enabled		
10	1	Battery Low Click	BLCR	Status of Battery Low Click Feature	Enum: 0x0: Battery Low Click Feature is Disabled 0x1: Battery Low Click Feature is Enabled		
11	5	Not Used (= 0)					
16	16	Sensor Update Interval	SUIR	Interval in seconds between the update of the environmental sensors. After each update period a Sensor Value packet (Message Type 0x00, see above) is transmitted	Enum: 0x0000...0x0004: Reserved 0x0005...0xFFFF: 5...65535 s		
32	8	Vacation Blink Interval	VBIR	Interval in seconds between the LED blinks when Vacation Mode is activated	Enum: 0x00...0x02: Reserved 0x03...0xFF: 3...255 s		

Message Type 0x20: Log Data 01



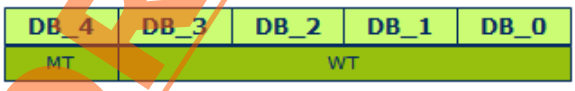
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Message Type	MT	Descriptor of this message	Enum: 0x20: Message Type Log Data 01		
8	32	Power Ons	PON	Number of Power Ons	Enum: 0x00000000...0xFFFFFFFF:		
40	32	Alarms	ALL	Number of Alarms	Enum: 0x00000000...0xFFFFFFFF:		

Message Type 0x21: Log Data 02



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Message Type	MT	Descriptor of this message	Enum: 0x21: Message Type Log Data 02		
8	32	Handle Movements Closed	HMC	Number of Handle Movements Closed	Enum: 0x00000000...0xFFFFFFFF:		
40	32	Handle Movements Opened	HMO	Number of Handle Movements Opened	Enum: 0x00000000...0xFFFFFFFF:		
72	32	Handle Movements Tilted	HMT	Number of Handle Movements Tilted	Enum: 0x00000000...0xFFFFFFFF:		

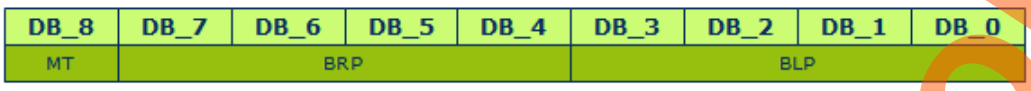
Message Type 0x22: Log Data 03



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Message Type	MT	Descriptor of this message	Enum: 0x22: Message Type Log Data 03		

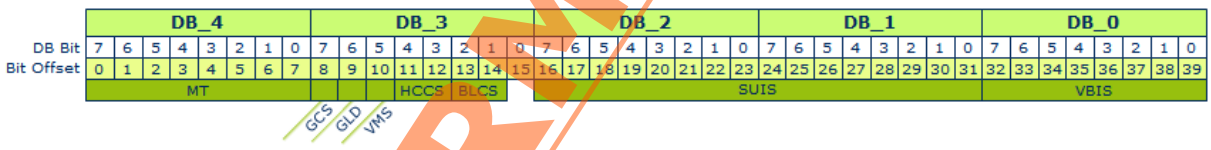
8	32	Window Tilts	WT	Number of Window Tilts	Enum: 0x00000000...0xFFFFFFFF:

Message Type 0x23: Log Data 04



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Message Type	MT	Descriptor of this message	Enum: 0x23: Message Type Log Data 04		
8	32	Button Right Presses	BRP	Number of Button Right Presses	Enum: 0x00000000...0xFFFFFFFF:		
40	32	Button Left Presses	BLP	Number of Button Left Presses	Enum: 0x00000000...0xFFFFFFFF:		

Message Type 0x80: Control and Settings



Notes:
The following settings are stored non volatile inside the handle and only need to be send on a change request:
- Handle Closed Click Feature
- Battery Low Click Feature
- Sensor Update Interval
- Vacation Blink Interval

It is possible to trigger several of the actions in one message; e.g. if DB3.7 and DB3.6 both are set, the handle will transmit the messages with the message types: 0x10, 0x20, 0x21, 0x22 and 0x23

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Message Type	MT	Descriptor of this message	Enum: 0x80: Message Type Control and Settings		
8	1	Get Configuration Settings	GCS	Start Transmission of the Configuration Settings (Message Type 0x10, see above)	Enum: 0x0: No Change 0x1: Start Transmission		
9	1	Get Log Data	GLD	Start Transmission of the Log Data Packets (Message Type 0x2x, see above)	Enum: 0x0: No Change 0x1: Start Transmission		
10	1	Vacation Mode	VMS	Set Vacation Mode	Enum: 0x0: Switch Vacation Mode Off 0x1: Switch Vacation Mode On		

11	2	Handle Closed Click	HCCS	Set Handle Closed Click Feature	Enum: 0x0: No Change 0x1: Disable Handle Closed Click Feature 0x2: Enable Handle Closed Click Feature 0x3: Reserved
13	2	Battery Low Click	BLCS	Set Battery Low Click Feature	Enum: 0x0: No Change 0x1: Disable Battery Low Click Feature 0x2: Enable Battery Low Click Feature 0x3: Reserved
15	1	Not Used (= 0)			
16	16	Sensor Update Interval	SUIS	Set Sensor Update Interval	Enum: 0x0000: No Change 0x0001...0x0004: Reserved 0x0005...0xFFFF: 5...65535 s
32	8	Vacation Blink Interval	VBIS	Set Vacation Blink Interval	Enum: 0x00: No Change 0x01...0x02: Reserved 0x03...0xFF: 3...255 s

D2-10: Room Control Panels with Temperature & Fan Speed Control, Room Status Information and Time Program

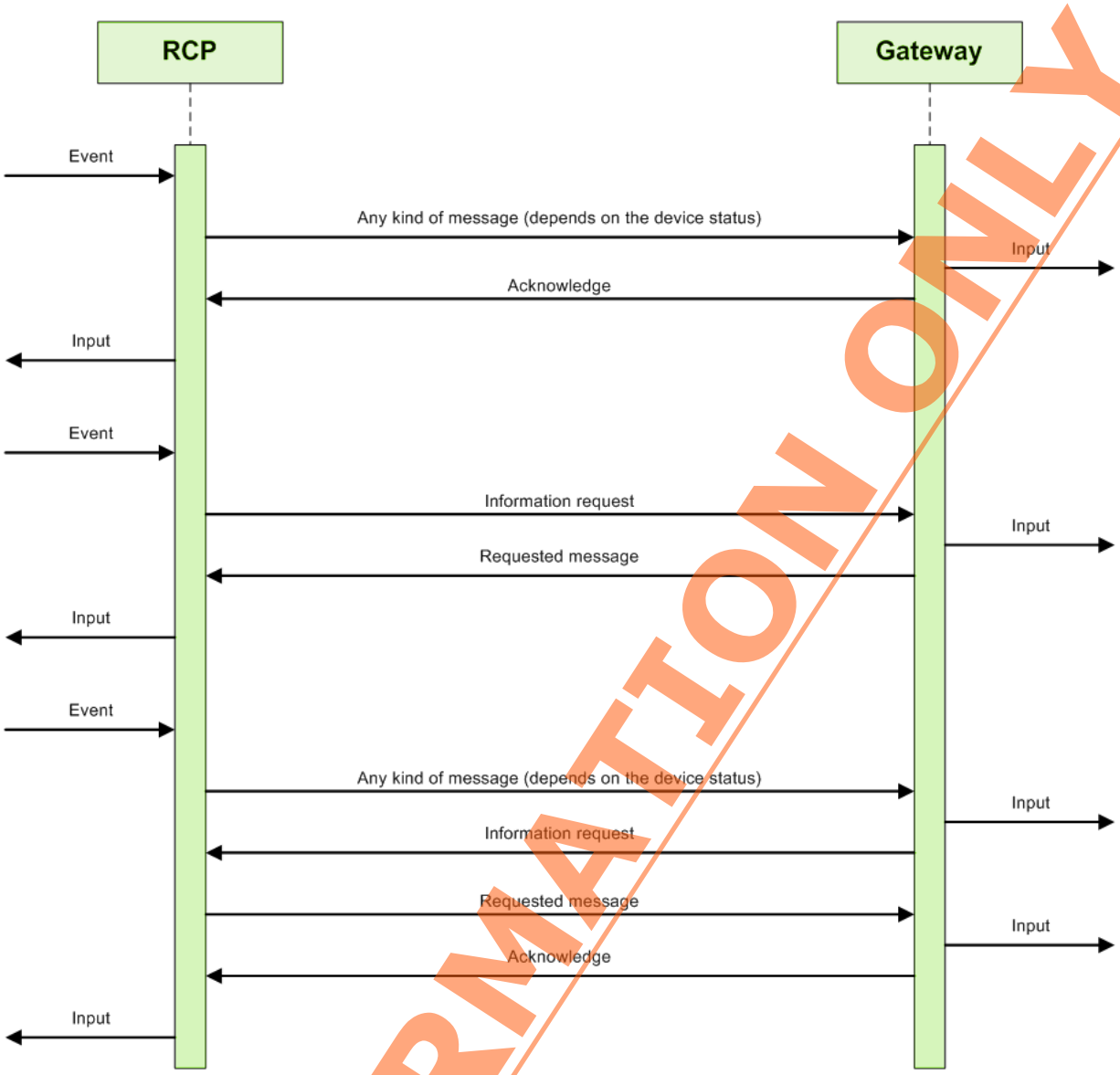
Submitter: Kieback&Peter GmbH & CO KG

Description

This VLD family consists of several profiles for a group of different room control panels with various functions and measurements (see following table of parameters for a feature list).

The profiles are designed to establish a communication between a battery-powered room control panel and a line-powered (and therefor always receiving) gateway. It also allows a gateway-to-gateway communication.

Due to the high energy consumption while powering the receiver, the room control panel will always be the initiator of a data exchange. It cannot be triggered by the gateway as it is not in a receiving mode most of the time.



Data exchange
Direction: bidirectional
Addressing: unicast (ADT) & broadcast
Communication trigger: event- & time-triggered
Communication interval: can be defined during runtime
Trigger event: device status change
Tx delay: 1 s
Rx timeout: N/A

Teach-in
Teach-in method: UTE

Security
Encryption required: no
Security level format: -

EEP Family Table:

Telegram	Type 00	Type 01	Type 02
General Message	X	X	X
Data Message	X	X	X
Configuration Message	X	X	X
Room Control Setup	X	X	X
Time Program Setup	X	X	-

Parameter	Type 00	Type 01	Type 02

Message Identifier	X	X	X
Message Continuation Flag	X	X	X
Information Request Classifier	X	X	X
Feedback Classifier	X	X	X
General Message Type	X	X	X
Humidity	X	-	-
Humidity Validity Flag	X	-	-
Fan Speed Control	X	-	-
Fan Speed Validity Flag	X	-	-
Fan Speed Mode	X	-	-
Custom Warning 2	X	X	X
Custom Warning 1	X	X	X
Mold Warning	X	-	-
Window Open Detection	X	X	X
Battery Status	X	X	X
Solar-power Status	X	-	X
PIR Status	X	-	X
Occupancy Button Status	X	X	X
Cooling Operation Status	X	-	-
Heating Operation Status	X	-	-
Room Control Mode	X	X	X
Temperature Set Point Validity	X	X	X
Temperature Validity	X	X	X
Temperature Set Point	X	X	X
Room Temperature	X	X	X
PIR Status Lock	X	-	X
Temperature Scale Lock	X	X	-
Display Content Lock	X	X	X
Date / Time Lock	X	X	X
Time Program Lock	X	X	X
Occupancy Button Lock	X	X	X
Temperature Set Point Lock	X	X	-
Fan Speed Lock	X	-	-
Radio Communication Interval	X	X	X
Key Lock	X	X	-
Display Content	X	X	X
Temperature Scale	X	X	X
Daylight Saving Time Flag	X	X	X
Time Notation	X	X	X
Day	X	X	X
Month	X	X	X
Year	X	X	X
Minute	X	X	X
Hour	X	X	X
Date / Time Update Flag	X	X	X
Temperature Set Point Building Protection Mode	X	X	-
Temperature Set Point Pre-comfort Mode	X	-	-
Temperature Set Point Economy Mode	X	X	X
Temperature Set Point Comfort Mode	X	X	X
Temperature Set Point Flag Building Protection Mode	X	X	-
Temperature Set Point Flag Pre-comfort Mode	X	-	-
Temperature Set Point Flag Economy Mode	X	X	X
Temperature Set Point Flag Comfort Mode	X	X	X
End Time: Minute	X	X	-
End Time: Hour	X	X	-
Start Time: Minute	X	X	-
Start Time: Hour	X	X	-
Period	X	X	-
Time Program Deletion	X	X	-

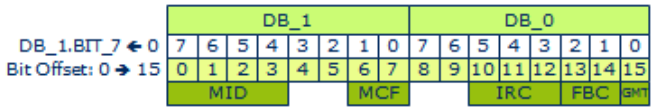
RORG	D2	VLD Telegram

FUNC	10	Room Control Panels with Temperature & Fan Speed Control, Room Status Information and Time Program
TYPE	00	Type 0x00

Submitter: Kieback&Peter GmbH & CO KG

General Message

exemplary illustration of data bytes 0/1:



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 0: General Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	2	Not Used (= 0)					
10	3	Information request classifier	IRC	Defines the type of information request	Enum: 7: Reserved 6: Reserved 5: Reserved 4: Time program request 3: Room control setup request 2: Configuration request 1: Data request 0: Acknowledge request		
13	2	Feedback classifier	FBC	Defines the type of feedback	Enum: 3: Reserved 2: Message repetition request 1: Telegram repetition request 0: Acknowledge / heartbeat		
15	1	General message type	GMT	Indicates if the general message is a feedback or an information request	Enum: 1: Information request		

					0: Feedback

Data Message

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 1: Data Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	8	Humidity	HUM	Measured humidity	0...255	0...100	%
16	1	Humidity validity flag	HVF	Indicates if the value for humidity is valid	Enum: 1: Valid value 0: No change		
17	7	Fan speed control	FS	Fan speed	0...100	0...100	%
24	1	Fan speed validity flag	FSV	Indicates if the fan speed value is valid	Enum: 1: Valid value 0: No change		
25	1	Fan speed mode	FSM	Defines the mode the fan runs in	Enum: 1: Individual fan speed control 0: Central fan speed control		
26	1	Not Used (= 0)					
27	1	Custom warning 2	CW2	Flag for an application specific warning	Enum: 1: True 0: False		
28	1	Custom warning 1	CW1	Flag for an application specific warning	Enum: 1: True 0: False		
29	1	Mold warning	MW	Flag for an application depending mold warning	Enum: 1: True 0: False		
30	2	Window open detection	WOD	Indicates if an open window is detected	Enum: 3: Reserved 2: Open 1: Closed 0: No change		
32	1	Not Used (= 0)					
33	2	Battery status	BS	Battery status	Enum: 3: Critical 2: Low 1: Good 0: No change		
35	1	Solar-powered status	SPS	Indicates if the device is powered by its solar cell	Enum: 1: Not solar-powered 0: Solar-powered		
36	2	PIR status	PIR	Indicates if the PIR detected a movement	Enum: 3: Locked 2: Movement detected		

					1: No movement detected 0: No change		
38	2	Occupancy button status	OBS	Indicates if the occupancy button was pressed and its occupancy status	Enum: 3: Reserved 2: Button pressed and unoccupied 1: Button pressed and occupied 0: No change		
40	2	Cooling	COO	Recent cooling operation status	Enum: 3: Automatic 2: Off 1: On 0: No change		
42	2	Heating	HEA	Recent heating operation status	Enum: 3: Automatic 2: Off 1: On 0: No change		
44	2	Room control mode	RCM	Recent room control mode	Enum: 3: Building protection 2: Pre-comfort 1: Economy 0: Comfort		
46	1	Temperature set point validity	SPV	Indicates if the temperature set point value is valid	Enum: 1: Valid value 0: No change		
47	1	Temperature validity	TPV	Indicates if the temperature value is valid	Enum: 1: Valid value 0: No change		
48	8	Temperature set point	TSP	Recent temperature set point	0...255	0...+40	°C
56	8	Temperature	TMP	Recent room temperature	0...255	0...+40	°C

Configuration Message

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 2: Configuration Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	1	PIR status lock	PSL	Indicates if the PIR status is transmitted or kept inside the room control panel	Enum: 1: Unlocked 0: Locked		
9	1	Temperature scale lock	TSL	Indicates if the temperature scale can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		

10	1	Display content lock	DCL	Indicates if the display content can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
11	1	Date / time lock	DTL	Indicates if date and time can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
12	1	Time program lock	TPL	Indicates if the time program can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
13	1	Occupancy button lock	OBL	Indicates if the occupancy status can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
14	1	Temperature set point lock	SPL	Indicates if the temperature set point can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
15	1	Fan speed lock	FSL	Indicates if the fan speed can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
16	6	Radio communication interval	RCI	Defines the longest time between two consecutive telegrams (clock-based communication)	Enum: 63: 24 hours 62: 12 hours 61: 3 hours 1...60: 1...60 min 0: No communication interval		
22	1	Key lock	KL	Indicates if all buttons on the device are locked	Enum: 1: Unlocked 0: Locked		
23	1	Not Used (= 0)					
24	3	Display content	DC	Defines the main display content	Enum: 7: Humidity 6: Display off 5: Temperature set point 4: Room temperature (external) 3: Room temperature (internal) 2: Time 1: Default 0: No change		
27	2	Temperature scale	TS	Defines the used temperature scale for the room control panel display and menus	Enum: 3: ° Fahrenheit 2: ° Celsius 1: Default 0: No change		
29	1	Daylight saving time flag	DST	Indicates if daylight saving time is supported	Enum: 1: Not supported 0: Supported		
30	2	Time notation	TN	Defines the used time notation	Enum: 3: 12 h 2: 24 h 1: Default 0: No change		
32	5	Day	DAY	Date format: YYYY/MM/DD	1...31	1...31	day

37	4	Month	MON	Date format: YYYY/MM/DD	1...12	1...12	mon
41	7	Year	YR	Date format: YYYY/MM/DD year = 2000 + x	0...127	2000...2127	year
48	6	Minute	MIN	Time format: hh:mm	0...59	0...59	min
54	2	Not Used (= 0)					
56	5	Hour	HR	Time format: hh:mm	0...23	0...23	h
61	2	Not Used (= 0)					
63	1	Date / time update flag	DTU	Indicates if an update of date or time is provided	Enum: 1: Update 0: No update		

Room Control Setup

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 3: Room Control Setup		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	8	Temperature set point building protection mode	SPB	Temperature set point building protection mode	0...255	0...+40	°C
16	8	Temperature set point pre-comfort mode	SPP	Temperature set point pre-comfort mode	0...255	0...+40	°C
24	8	Temperature set point economy mode	SPE	Temperature set point economy mode	0...255	0...+40	°C
32	8	Temperature set point comfort mode	SPC	Temperature set point comfort mode	0...255	0...+40	°C
40	4	Not Used (= 0)					
44	1	Temperature set point flag building protection mode	SFB	Indicates if a temperature set point for the building protection mode is provided	Enum: 1: Valid value 0: No change		
45	1	Temperature set point flag pre-comfort mode	SFP	Indicates if a temperature set point for the pre-comfort mode is provided	Enum: 1: Valid value 0: No change		
46	1	Temperature set point flag economy mode	SFE	Indicates if a temperature set point for the economy mode is provided	Enum: 1: Valid value 0: No change		
47	1	Temperature set point flag comfort mode	SFC	Indicates if a temperature set point for the comfort mode is provided	Enum: 1: Valid value 0: No change		

Time Program Setup

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 4: Time Program Setup		
3	3	Not Used (= 0)					

6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	2	Not Used (= 0)					
10	6	End time: Minute	ETM	Time format: hh:mm	0...59	0...59	1
16	3	Not Used (= 0)					
19	5	End time: Hour	ETH	Time format: hh:mm	0...23	0...23	1
24	2	Not Used (= 0)					
26	6	Start time: Minute	STM	Time format: hh:mm	0...59	0...59	1
32	3	Not Used (= 0)					
35	5	Start time: Hour	STH	Time format: hh:mm	0...23	0...23	1
40	4	Period	PER	Assigned period of time (weekdays) for the provided schedule time	Enum: 15: Friday - Monday 14: Friday - Sunday 13: Thursday - Friday 12: Wednesday - Friday 11: Tuesday - Thursday 10: Monday - Wednesday 9: Sunday 8: Saturday 7: Friday 6: Thursday 5: Wednesday 4: Tuesday 3: Monday 2: Saturday - Sunday 1: Monday - Friday 0: Monday - Sunday		
44	2	Room control mode	RCM	Assigned room control mode for the provided schedule time	Enum: 3: Building protection 2: Pre-comfort 1: Economy 0: Comfort		
46	1	Not Used (= 0)					
47	1	Time program deletion	TPD	Deletes the stored time program	Enum: 1: Deletion 0: No deletion		

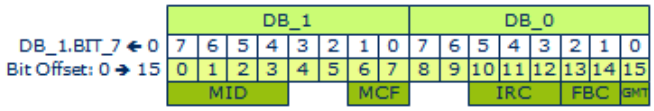
RORG	D2	VLD Telegram
FUNC	10	Room Control Panels with Temperature & Fan Speed Control, Room Status Information and Time Program

TYPE	01	Type 0x01

Submitter: Kieback&Peter GmbH & CO KG

General Message

exemplary illustration of data bytes 0/1:



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 0: General Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	2	Not Used (= 0)					
10	3	Information request classifier	IRC	Defines the type of information request	Enum: 7: Reserved 6: Reserved 5: Reserved 4: Time program request 3: Room control setup request 2: Configuration request 1: Data request 0: Acknowledge request		
13	2	Feedback classifier	FBC	Defines the type of feedback	Enum: 3: Reserved 2: Message repetition request 1: Telegram repetition request 0: Acknowledge / heartbeat		
15	1	General message type	GMT	Indicates if the general message is a feedback or an information request	Enum: 1: Information request 0: Feedback		

Data Message

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 1: Data Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	8	Not Used (= 0)					
16	1	Not Used (= 0)					
17	7	Not Used (= 0)					
24	1	Not Used (= 0)					
25	1	Not Used (= 0)					
26	1	Not Used (= 0)					
27	1	Custom warning 2	CW2	Flag for an application specific warning	Enum: 1: True 0: False		
28	1	Custom warning 1	CW1	Flag for an application specific warning	Enum: 1: True 0: False		
29	1	Not Used (= 0)					
30	2	Window open detection	WOD	Indicates if an open window is detected	Enum: 3: Reserved 2: Open 1: Closed 0: No change		
32	1	Not Used (= 0)					
33	2	Battery status	BS	Battery status	Enum: 3: Critical 2: Low 1: Good 0: No change		
35	1	Not Used (= 0)					
36	2	Not Used (= 0)					
38	2	Occupancy button status	OBS	Indicates if the occupancy button was pressed and its occupancy status	Enum: 3: Reserved 2: Button pressed and unoccupied 1: Button pressed and occupied 0: No change		
40	2	Not Used (= 0)					
42	2	Not Used (= 0)					
44	2	Room control mode	RCM	Recent room control mode	Enum: 3: Building protection 2: Pre-comfort 1: Economy 0: Comfort		
46	1	Temperature set point validity	SPV	Indicates if the temperature set point value is valid	Enum: 1: Valid value 0: No change		

47	1	Temperature validity	TPV	Indicates if the temperature value is valid	Enum: 1: Valid value 0: No change		
48	8	Temperature set point	TSP	Recent temperature set point	0...255	0...+40	°C
56	8	Temperature	TMP	Recent room temperature	0...255	0...+40	°C

Configuration Message

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 2: Configuration Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	1	Not Used (= 0)					
9	1	Temperature scale lock	TSL	Indicates if the temperature scale can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
10	1	Display content lock	DCL	Indicates if the display content can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
11	1	Date / time lock	DTL	Indicates if date and time can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
12	1	Time program lock	TPL	Indicates if the time program can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
13	1	Occupancy button lock	OBL	Indicates if the occupancy status can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
14	1	Temperature set point lock	SPL	Indicates if the temperature set point can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
15	1	Not Used (= 0)					
16	6	Radio communication interval	RCI	Defines the longest time between two consecutive telegrams (clock-based communication)	Enum: 63: 24 hours 62: 12 hours 61: 3 hours 1...60: 1...60 min 0: No communication interval		
22	1	Key lock	KL	Indicates if all buttons on the device are locked	Enum: 1: Unlocked 0: Locked		
23	1	Not Used (= 0)					

24	3	Display content	DC	Defines the main display content	Enum: 7: Humidity 6: Display off 5: Temperature set point 4: Room temperature (external) 3: Room temperature (internal) 2: Time 1: Default 0: No change		
27	2	Temperature scale	TS	Defines the used temperature scale for the room control panel display and menus	Enum: 3: ° Fahrenheit 2: ° Celsius 1: Default 0: No change		
29	1	Daylight saving time flag	DST	Indicates if daylight saving time is supported	Enum: 1: Not supported 0: Supported		
30	2	Time notation	TN	Defines the used time notation	Enum: 3: 12 h 2: 24 h 1: Default 0: No change		
32	5	Day	DAY	Date format: YYYY/MM/DD	1...31	1...31	day
37	4	Month	MON	Date format: YYYY/MM/DD	1...12	1...12	mon
41	7	Year	YR	Date format: YYYY/MM/DD year = 2000 + x	0...127	2000...2127	year
48	6	Minute	MIN	Time format: hh:mm	0...59	0...59	min
54	2	Not Used (= 0)					
56	5	Hour	HR	Time format: hh:mm	0...23	0...23	h
61	2	Not Used (= 0)					
63	1	Date / time update flag	DTU	Indicates if an update of date or time is provided	Enum: 1: Update 0: No update		

Room Control Setup

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 3: Room Control Setup		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	8	Temperature set point building protection mode	SPB	Temperature set point building protection mode	0...255	0...+40	°C

16	8	Not Used (= 0)					
24	8	Temperature set point economy mode	SPE	Temperature set point economy mode	0...255	0...+40	°C
32	8	Temperature set point comfort mode	SPC	Temperature set point comfort mode	0...255	0...+40	°C
40	4	Not Used (= 0)					
44	1	Temperature set point flag building protection mode	SFB	Indicates if a temperature set point for the building protection mode is provided	Enum: 1: Valid value 0: No change		
45	1	Not Used (= 0)					
46	1	Temperature set point flag economy mode	SFE	Indicates if a temperature set point for the economy mode is provided	Enum: 1: Valid value 0: No change		
47	1	Temperature set point flag comfort mode	SFC	Indicates if a temperature set point for the comfort mode is provided	Enum: 1: Valid value 0: No change		

Time Program Setup

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 4: Time Program Setup		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	2	Not Used (= 0)					
10	6	End time: Minute	ETM	Time format: hh:mm	0...59	0...59	1
16	3	Not Used (= 0)					
19	5	End time: Hour	ETH	Time format: hh:mm	0...23	0...23	1
24	2	Not Used (= 0)					
26	6	Start time: Minute	STM	Time format: hh:mm	0...59	0...59	1
32	3	Not Used (= 0)					
35	5	Start time: Hour	STH	Time format: hh:mm	0...23	0...23	1
40	4	Period	PER	Assigned period of time (weekdays) for the provided schedule time	Enum: 15: Friday - Monday 14: Friday - Sunday 13: Thursday - Friday 12: Wednesday - Friday 11: Tuesday - Thursday 10: Monday - Wednesday 9: Sunday 8: Saturday 7: Friday 6: Thursday		

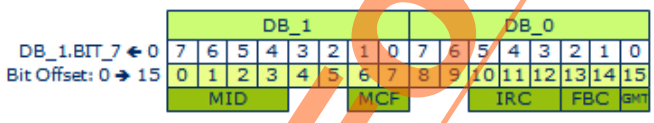
					5: Wednesday 4: Tuesday 3: Monday 2: Saturday - Sunday 1: Monday - Friday 0: Monday - Sunday
44	2	Room control mode	RCM	Assigned room control mode for the provided schedule time	Enum: 3: Building protection 2: Pre-comfort 1: Economy 0: Comfort
46	1	Not Used (= 0)			
47	1	Time program deletion	TPD	Deletes the stored time program	Enum: 1: Deletion 0: No deletion

RORG	D2	**VLD Telegram**
FUNC	10	Room Control Panels with Temperature & Fan Speed Control, Room Status Information and Time Program
TYPE	02	Type 0x02

Submitter: Kieback&Peter GmbH & CO KG

General Message

exemplary illustration of data bytes 0/1:



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 0: General Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	2	Not Used (= 0)					
10	3	Information request classifier	IRC	Defines the type of information request	Enum: 7: Reserved		

					6: Reserved 5: Reserved 4: Time program request 3: Room control setup request 2: Configuration request 1: Data request 0: Acknowledge request
13	2	Feedback classifier	FBC	Defines the type of feedback	Enum: 3: Reserved 2: Message repetition request 1: Telegram repetition request 0: Acknowledge / heartbeat
15	1	General message type	GMT	Indicates if the general message is a feedback or an information request	Enum: 1: Information request 0: Feedback

Data Message

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 1: Data Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	8	Not Used (= 0)					
16	1	Not Used (= 0)					
17	7	Not Used (= 0)					
24	1	Not Used (= 0)					
25	1	Not Used (= 0)					
26	1	Not Used (= 0)					
27	1	Custom warning 2	CW2	Flag for an application specific warning	Enum: 1: True 0: False		
28	1	Custom warning 1	CW1	Flag for an application specific warning	Enum: 1: True 0: False		
29	1	Not Used (= 0)					
30	2	Window open detection	WOD	Indicates if an open window is detected	Enum: 3: Reserved 2: Open 1: Closed 0: No change		

32	1	Not Used (= 0)					
33	2	Battery status	BS	Battery status	Enum: 3: Critical 2: Low 1: Good 0: No change		
35	1	Solar-powered status	SPS	Indicates if the device is powered by its solar cell	Enum: 1: Not solar-powered 0: Solar-powered		
36	2	PIR status	PIR	Indicates if the PIR detected a movement	Enum: 3: Locked 2: Movement detected 1: No movement detected 0: No change		
38	2	Occupancy button status	OBS	Indicates if the occupancy button was pressed and its occupancy status	Enum: 3: Reserved 2: Button pressed and unoccupied 1: Button pressed and occupied 0: No change		
40	2	Not Used (= 0)					
42	2	Not Used (= 0)					
44	2	Room control mode	RCM	Recent room control mode	Enum: 3: Building protection 2: Pre-comfort 1: Economy 0: Comfort		
46	1	Temperature set point validity	SPV	Indicates if the temperature set point value is valid	Enum: 1: Valid value 0: No change		
47	1	Temperature validity	TPV	Indicates if the temperature value is valid	Enum: 1: Valid value 0: No change		
48	8	Temperature set point	TSP	Recent temperature set point	0...255	0...+40	°C
56	8	Temperature	TMP	Recent room temperature	0...255	0...+40	°C

Configuration Message

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 2: Configuration Message		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		

8	1	PIR status lock	PSL	Indicates if the PIR status is transmitted or kept inside the room control panel	Enum: 1: Unlocked 0: Locked		
9	1	Not Used (= 0)					
10	1	Display content lock	DCL	Indicates if the display content can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
11	1	Date / time lock	DTL	Indicates if date and time can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
12	1	Time program lock	TPL	Indicates if the time program can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
13	1	Occupancy button lock	OBL	Indicates if the occupancy status can be changed at the room control panel	Enum: 1: Unlocked 0: Locked		
14	1	Not Used (= 0)					
15	1	Not Used (= 0)					
16	6	Radio communication interval	RCI	Defines the longest time between two consecutive telegrams (clock-based communication)	Enum: 63: 24 hours 62: 12 hours 61: 3 hours 1...60: 1...60 min 0: No communication interval		
22	1	Not Used (= 0)					
23	1	Not Used (= 0)					
24	3	Display content	DC	Defines the main display content	Enum: 7: Humidity 6: Display off 5: Temperature set point 4: Room temperature (external) 3: Room temperature (internal) 2: Time 1: Default 0: No change		
27	2	Temperature scale	TS	Defines the used temperature scale for the room control panel display and menus	Enum: 3: ° Fahrenheit 2: ° Celsius 1: Default 0: No change		
29	1	Daylight saving time flag	DST	Indicates if daylight saving time is supported	Enum: 1: Not supported 0: Supported		
30	2	Time notation	TN	Defines the used time notation	Enum: 3: 12 h 2: 24 h 1: Default 0: No change		
32	5	Day	DAY	Date format: YYYY/MM/DD	1...31	1...31	day
37	4	Month	MON	Date format: YYYY/MM/DD	1...12	1...12	mon

41	7	Year	YR	Date format: YYYY/MM/DD year = 2000 + x	0...127	2000...2127	year
48	6	Minute	MIN	Time format: hh:mm	0...59	0...59	min
54	2	Not Used (= 0)					
56	5	Hour	HR	Time format: hh:mm	0...23	0...23	h
61	2	Not Used (= 0)					
63	1	Date / time update flag	DTU	Indicates if an update of date or time is provided	Enum: 1: Update 0: No update		

Room Control Setup

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message identifier	MID	Defines the type of message	Enum: 3: Room Control Setup		
3	3	Not Used (= 0)					
6	2	Message continuation flag	MCF	Indicates if another telegram has to be expected or if the message is complete	Enum: 3: Reserved 2: Automatic message control 1: Incomplete 0: Complete		
8	8	Not Used (= 0)					
16	8	Not Used (= 0)					
24	8	Temperature set point economy mode	SPE	Temperature set point economy mode	0...255	0...+40	°C
32	8	Temperature set point comfort mode	SPC	Temperature set point comfort mode	0...255	0...+40	°C
40	4	Not Used (= 0)					
44	1	Not Used (= 0)					
45	1	Not Used (= 0)					
46	1	Temperature set point flag economy mode	SFE	Indicates if a temperature set point for the economy mode is provided	Enum: 1: Valid value 0: No change		
47	1	Temperature set point flag comfort mode	SFC	Indicates if a temperature set point for the comfort mode is provided	Enum: 1: Valid value 0: No change		

D2-11: Bidirectional Room Operating Panel

Submitter: Thermokon Sensortechnik GmbH

Data exchange
Direction: bidirectional (Smart-Ack)
Addressing: broadcast and addressed
Communication trigger: event- & time-triggered
Communication interval: time-triggered (configurable at the device) & event-triggered
Trigger event: keypress
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: Smart-Ack teach-in without repeater

Security

Encryption required: no
Security level format: -

Product Description
The device represented by this EEP is a "Bidirectional Room Operating Panel with Display". It is powered by solar cell.

It may be equipped with the following features (for details please see the EEP-Family table below):

- Temperature Sensor
- Humidity Sensor
- Temperature Setpoint Adjustment
- Fan Speed Adjustment
- Occupancy-State Adjustment

For pairing the bidirectional "Smart Ack Teach-In without repeater" method is used.

The device transmits the actual sensor values periodically (default: 1000 s) or on the event keypress.

Temperature Sensor, Humidity Sensor
The environmental sensors are updated periodically (adjustable, default: 100 s) and, if there is a change, the updated values will be send immediately.

The Smart Ack functionality will be used for setting display symbols like "window open, heating/cooling, occupancy state" or for overwriting parameters like setpoint, fan speed or occupancy state which are stored at the device.

EEP Family Table:

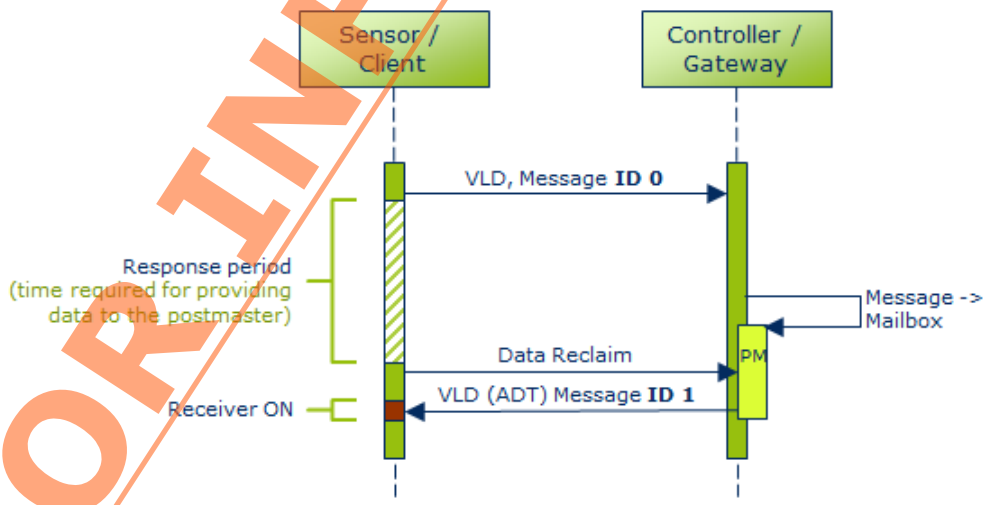
Type	01	02	03	04	05	06	07	08
Temperature Measurement	X	X	X	X	X	X	X	X
Setpoint	X	X	X	X	X	X	X	X
Humidity Measurement	-	X	-	X	-	X	-	X
Fan Speed	-	-	X	X	X	X	-	-
Occupancy	-	-	-	-	X	X	X	X

For the types 0x01, 0x03, 0x05, 0x07 the value of DB3 at message type C will be 0 = not available.

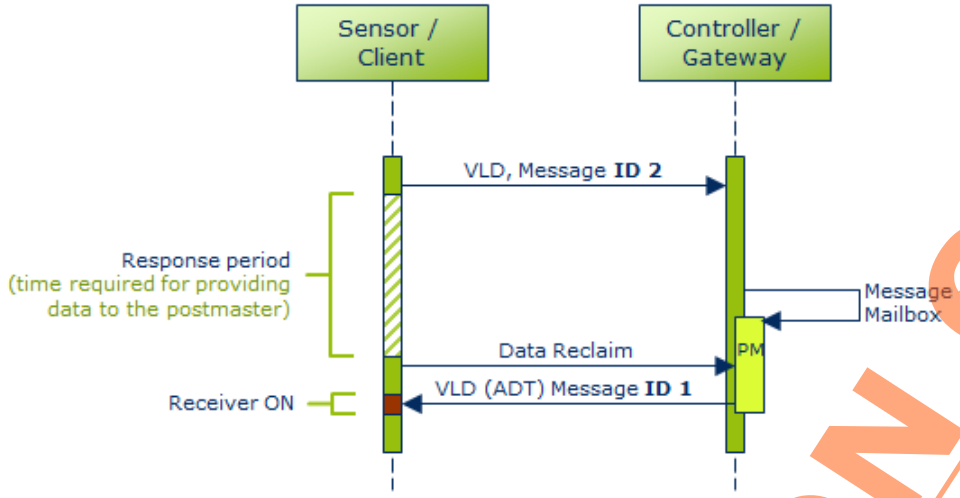
For the types 0x01, 0x02, 0x07, 0x08 the value of DB0.3 ... DB0.1 at message type B and C will be 7 = not available.

For the types 0x01, 0x02, 0x03, 0x04 the value of DB0.0 at message type C has to be 0 = not used.

Communication flow, triggered by a keystroke (first keystroke within inactive state, display state is off):



Communication flow, triggered by an event like temperature- and or humidity change or heartbeat:

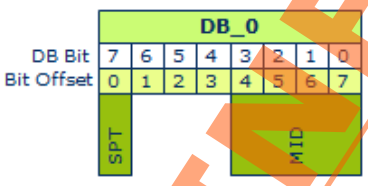


RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	01	Type 0x01

Message type A / ID 0 (First switch press after sleep-mode, request new data)

Direction: Sensor -> Gateway

Bit 0.7 indicates which setpoint type is actual used at the device. The difference is made at the visualization of the setpoint (real temperature setpoint (24.5°C) or setpoint shift (+ 3.0°C)) and this information is needed for interpreting the value of DB2 at Message Type C (ID2).



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Setpoint type	SPT	Setpoint type actual used by the device (temperature correction / temperature setpoint)	Enum: 0: Temperature correction 1: Temperature setpoint		
1	3	Not Used (= 0)					
4	4	Message ID	MID	Message Type A, ID-0	Enum: 0: ID-0 1: ID-1 2: ID-2		

					3...15: Reserved

Message type B / ID 1 (Override device parameter, reply to data request)

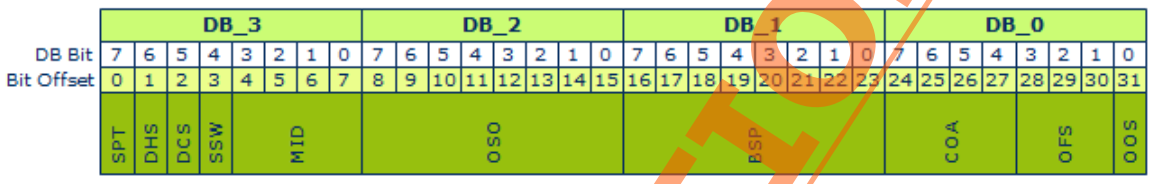
Direction: Gateway -> Sensor

Bit 3.7 may be used for setting new setpoint type at the device. If no change is needed mirroring Bit 0.7 of the last received Message Type A is required.

Byte 2 may be used for overwriting the actual setpoint shift at the device (i.e. for resetting the setpoint shift at the evening to default value). If no change is needed mirroring Byte 2 of the last received Message-Type C is required.

Byte 1 may be used for setting new basesetpoint at the device. If no change is needed mirroring Byte 1 of the last received Message-Type C is required.

Bit 0.7 ... 0.4 may be used for setting new valid setpoint shift at the device. If no change is needed mirroring Bit0.7 ... 0.4 of the last received Message-Type C is required.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Set Setpoint type	SPT	Set setpoint type to be used by the device	Enum: 0: Temperature correction 1: Temperature setpoint		
1	1	Display heating symbol	DHS	Set/Clear heating symbol at the display	Enum: 0: Heating symbol off 1: Heating symbol on		
2	1	Display cooling symbol	DCS	Set/Clear cooling symbol at the display	Enum: 0: Cooling symbol off 1: Cooling symbol on		
3	1	Display "window open" symbol	SSW	Set/Clear "window open" symbol at the display	Enum: 0: "Window open" symbol off 1: "Window open" symbol on		
4	4	Message ID	MID	Message Type B, ID-1	Enum: 0: ID-0 1: ID-1 2: ID-2 3...15: Reserved		
8	8	Temperature correction	OSO	Override Setpoint offset (linear, min. - ... max. +) (valid temperature correction)	0...255	according to **COA**	K
16	8	Basesetpoint	BSP	Set basesetpoint for visualization of the temperature setpoint	Enum: 0...14: Reserved 15...30: 15...30 °C 31...255: Reserved		
24	4	Valid temperature correction	COA	Set valid temperature correction	Enum: 0: Reserved 1: -1...1		K

					2: K -2...2 3: K -3...3 4: K -4...4 5: K -5...5 6: K -6...6 7: K -7...7 8: K -8...8 9: K -9...9 10: K -10...10 11...15: Reserved
28	3	Fan Speed	OFS	Override actual Fan Speed	Enum: 0: Auto 1: Speed 0 2: Speed 1 3: Speed 2 4: Speed 3 5...6: Reserved 7: Not available
31	1	Occupancy State	OOS	Override actual Occupancy State	Enum: 0: State Unoccupied 1: State Occupied

Message type C / ID 2 (Transmit actual data)

Direction: Sensor -> Gateway

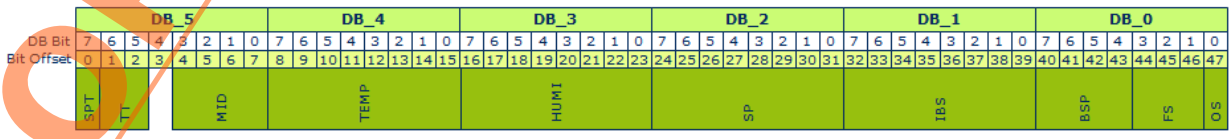
Bit 5.7 indicates which setpoint type is actual used at the device. The difference is made at the visualization of the setpoint (real temperature setpoint (24.5 °C) or setpoint shift (+ 3.0 °C)) and this information is needed for interpreting the value of DB2.

Byte 4 transmits the actual measured temperature.

Byte 2 transmits the actual setpoint shift. How to interpret this value is a combination of Bit 5.7, Byte 1 and Bit 0.7 … 0.4.
If the actual setpoint type is setpoint shift, then the value of Byte 2 only represents the scaled valid setpoint shift at Bit 0.7 … 0.4.
If the setpoint type is temperature setpoint, then the temperature setpoint is calculated as sum of the internal basesetpoint at Byte 1 and the scaled valid setpoint shift at Bit 0.7 … 0.4, transmitted at Byte 2.

Byte 1 transmits the actual, at the device stored, basesetpoint.

Bit 0.7 … 0.4 transmits the actual valid, at the device stored, setpoint shift.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit

0	1	Setpoint type	SPT	Setpoint type actual used by the device (temperature correction / temperature setpoint)	Enum: 0: Temperature correction 1: Temperature setpoint		
1	2	Telegram Type	TT	Telegram Trigger	Enum: 0: Heartbeat 1: Change of temperature- or humidity value 2: User caused parameter change		
3	1	Not Used (= 0)					
4	4	Message ID	MID	Message Type C, ID-2	Enum: 0: ID-0 1: ID-1 2: ID-2 3...15: Reserved		
8	8	Temperature	TEMP	Temperature	0...255	0...+40	°C
16	8	Humidity	HUMI	Humidity	0...250	0...+100	%rH
24	8	Setpoint offset	SP	Setpoint shift, linear (refers to valid setpoint shift at DB0.7 … DB0.4)	0...255	according to **BSB**	K
32	8	Basesetpoint	IBS	Internal basesetpoint, required for setpoint type "temperature setpoint"	Enum: 0...14: Reserved 15...30: °C 15...30 31...255: Reserved		
40	4	Valid temperature correction	BSB	Valid temperature correction	Enum: 0: Reserved 1: K -1...1 2: K -2...2 3: K -3...3 4: K -4...4 5: K -5...5 6: K -6...6 7: K -7...7 8: K -8...8 9: K -9...9 10: K -10...10 11...15: Reserved		
44	3	Fan Speed	FS	Fan Speed	Enum: 0: Auto 1: Speed 0 2: Speed 1 3: Speed 2 4: Speed 3 5...6: Reserved 7: Not available		
47	1	Occupancy State	OS	Occupancy State	Enum: 0: State Unoccupied 1: State Occupied		

RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	02	Type 0x02 (description: see table)

See profile: D2-11-01

RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	03	Type 0x03 (description: see table)

See profile: D2-11-01

RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	04	Type 0x04 (description: see table)

See profile: D2-11-01

RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	05	Type 0x05 (description: see table)

See profile: D2-11-01

RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	06	Type 0x06 (description: see table)

See profile: D2-11-01

RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	07	Type 0x07 (description: see table)

See profile: D2-11-01

RORG	D2	VLD Telegram
FUNC	11	Bidirectional Room Operating Panel
TYPE	08	Type 0x08 (description: see table)

See profile: D2-11-01

D2-20: Fan Control

The EEP family D2-20-xx provides different telegram types for fan control and fan supervision messages using various parameters and variables.
Devices using this EEP family may include a master-slave function (for further description see subheading ´Master-slave function´).

EEP Properties:

DATA EXCHANGE
Direction: bidirectional
Addressing: unicast (ADT) + broadcast
Communication trigger: event-triggered
Communication interval: N/A
Trigger event: query / polling
Tx delay: N/A
Rx timeout : N/A

TEACH-IN
Teach-in method: Universal teach-in (UTE)

SECURITY
Encryption supported: no
Security level: none

EEP Family Table:

Supported function	Type 00	Type 01	Type 02
Fan Speed	X	X	X
Fan Speed Status	X	X	X
Humidity	X	-	-
Humidity Control	X	-	-
Humidity Control Status	X	-	X
Humidity Threshold	X	-	-
Message Type	X	X	X
Operating Mode	X	-	-
Operating Mode Status	X	X	-
Room Size	X	X	X
Room Size Reference	X	X	X
Room Size Reference Status	X	X	X
Room Size Status	X	X	X
Service Information	X	-	-
Temperature Level	X	-	-

Each TYPE has to support every parameter that is marked in its column!

Master-slave function:
A device using this EEP may be able to work as a master or a slave fan. Master fans control slave fans. Slave fans are controlled by master fans. These roles are defined during the teach-in process. A slave fan will always be taught-in to a master. A master fan will accept teach-in requests from slave fans. A fan that is taught-in to another device will from now on work as a slave. A fan that accepted the teach-in of another device will go on working as a master. Combining master fans is not possible. Not every device is able to work as a master and a slave. Certain fans might only be able to be used as slaves.

RORG	D2	VLD Telegram
FUNC	20	Fan Control
TYPE	00	Type 0x00

Submitter: Maico Elektroapparate-Fabrik GmbH

Telegram Definition : 'Fan Control Message'

* Devices with discrete fan speed levels instead of a continuous fan speed range should divide the full range linearly

and match values beside those discrete levels to the next lower fan speed level.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Operating Mode	OM	Sets the operating mode	Enum: 0: Disabled 1: Standard compliant 2...14: Reserved 15: No change		
4	1	Not Used (= 0)					
5	2	Temperature Level	TL	Status of the temperature supervision	Enum: 0: Too low 1: Normal 2: Too high 3: No change		
7	1	Message Type	MT	Defines the message type	Enum: 0: Fan control		
8	2	Humidity Control	HC	Activates the humidity control	Enum: 0: Disabled 1: Enabled 2: Default 3: No change		
10	2	Room Size Reference	RSR	Defines if the provided room size has to be considered	Enum: 0: Used 1: Not used 2: Default 3: No change		
12	4	Room Size	RS	Defines the room size	Enum: 0: < 25 m² 1: 25...50 m² 2: 50...75 m² 3: 75...100 m² 4: 100...125 m² 5: 125...150 m² 6: 150...175 m² 7: 175...200 m² 8: 200...225 m² 9: 225...250 m² 10: 250...275 m² 11: 275...300 m² 12: 300...325 m² 13: 325...350 m² 14: > 350 m² 15: No change		
16	8	Humidity Threshold	HT	Sets the humidity threshold	Enum: 0...100: 0...100% 101...252: Reserved 253: Auto 254: Default 255: No change		
24	8	Fan Speed *	FS	Sets the fan speed	Enum: 0...100: 0...100% 101...252: Reserved 253: Auto 254: Default 255: No change		

Telegram Definition : 'Fan Status Message'

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Operating Mode Status	OMS	Provides the recent operating mode	Enum: 0: Disabled 1: Standard compliant 2...14: Reserved 15: Not supported		
4	3	Service Information	SI	Service information	Enum: 0: Nothing to report 1: Air filter error 2: Hardware error 3...6: Reserved 7: Not supported		
7	1	Message Type	MT	Defines the message type	Enum: 1: Fan status		
8	2	Humidity Control Status	HCS	States if the humidity control is active	Enum: 0: Disabled 1: Enabled 2: Reserved 3: Not supported		
10	2	Room Size Reference	RSR	States if the provided room size has to be considered	Enum: 0: Used 1: Not used 2: Reserved 3: Not supported		
12	4	Room Size Status	RSS	Room size status	Enum: 0: < 25 m² 1: 25...50 m² 2: 50...75 m² 3: 75...100 m² 4: 100...125 m² 5: 125...150 m² 6: 150...175 m² 7: 175...200 m² 8: 200...225 m² 9: 225...250 m² 10: 250...275 m² 11: 275...300 m² 12: 300...325 m² 13: 325...350 m² 14: > 350 m² 15: Not supported		
16	8	Humidity	HUM	Humidity measurement	Enum: 0...100: 0...100% 101...254: Reserved 255: Not supported		
24	8	Fan Speed Status	FSS	Fan speed	Enum: 0...100: 0...100% 101...254: Reserved 255: Not supported		

RORG	D2	VLD Telegram
FUNC	20	Fan Control
TYPE	01	Type 0x01

Submitter: Maico Elektroapparate-Fabrik GmbH

Telegram Definition : 'Fan Control Message'

* Devices with discrete fan speed levels instead of a continuous fan speed range should divide the full range linearly and match values beside those discrete levels to the next lower fan speed level.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	7	Not Used (= 0)					
7	1	Message Type	MT	Defines the message type	Enum: 0: Fan control		
8	2	Not Used (= 0)					
10	2	Room Size Reference	RSR	Defines if the provided room size has to be considered	Enum: 0: Used 1: Not used 2: Default 3: No change		
12	4	Room Size	RS	Defines the room size	Enum: 0: < 25 m² 1: 25...50 m² 2: 50...75 m² 3: 75...100 m² 4: 100...125 m² 5: 125...150 m² 6: 150...175 m² 7: 175...200 m² 8: 200...225 m² 9: 225...250 m² 10: 250...275 m² 11: 275...300 m² 12: 300...325 m² 13: 325...350 m² 14: > 350 m² 15: No change		
16	8	Not Used (= 0)					
24	8	Fan Speed *	FS	Sets the fan speed	Enum: 0...100: 0...100% 101...252: Reserved 253: Auto 254: Default 255: No change		

Telegram Definition : 'Fan Status Message'

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Operating Mode Status	OMS	Provides the recent operating mode	Enum: 0: Disabled		

					1: Standard compliant 2...14: Reserved 15: Not supported
4	3	Not Used (= 0)			
7	1	Message Type	MT	Defines the message type	Enum: 1: Fan status
8	2	Not Used (= 0)			
10	2	Room Size Reference	RSR	States if the provided room size has to be considered	Enum: 0: Used 1: Not used 2: Reserved 3: Not supported
12	4	Room Size Status	RSS	Room size status	Enum: 0: < 25 m² 1: 25...50 m² 2: 50...75 m² 3: 75...100 m² 4: 100...125 m² 5: 125...150 m² 6: 150...175 m² 7: 175...200 m² 8: 200...225 m² 9: 225...250 m² 10: 250...275 m² 11: 275...300 m² 12: 300...325 m² 13: 325...350 m² 14: > 350 m² 15: Not supported
16	8	Not Used (= 0)			
24	8	Fan Speed Status	FSS	Fan speed	Enum: 0...100: 0...100% 101...254: Reserved 255: Not supported

RORG	D2	**VLD Telegram**
FUNC	20	Fan Control
TYPE	02	Type 0x02

Submitter: Maico Elektroapparate-Fabrik GmbH

Telegram Definition : 'Fan Control Message'

* Devices with discrete fan speed levels instead of a continuous fan speed range should divide the full range linearly and match values beside those discrete levels to the next lower fan speed level.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	7	Not Used (= 0)					
7	1	Message Type	MT	Defines the message type	Enum: 0: Fan control		
8	2	Not Used (= 0)					
10	2	Room Size Reference	RSR	Defines if the provided room size has to be considered	Enum: 0: Used 1: Not used		

					2: Default 3: No change
12	4	Room Size	RS	Defines the room size	Enum: 0: < 25 m² 1: 25...50 m² 2: 50...75 m² 3: 75...100 m² 4: 100...125 m² 5: 125...150 m² 6: 150...175 m² 7: 175...200 m² 8: 200...225 m² 9: 225...250 m² 10: 250...275 m² 11: 275...300 m² 12: 300...325 m² 13: 325...350 m² 14: > 350 m² 15: No change
16	8	Not Used (= 0)			
24	8	Fan Speed *	FS	Sets the fan speed	Enum: 0...100: 0...100% 101...252: Reserved 253: Auto 254: Default 255: No change

Telegram Definition : 'Fan Status Message'

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	7	Not Used (= 0)					
7	1	Message Type	MT	Defines the message type	Enum: 1: Fan status		
8	2	Humidity Control Status	HCS	States if the humidity control is active	Enum: 0: Disabled 1: Enabled 2: Reserved 3: Not supported		
10	2	Room Size Reference	RSR	States if the provided room size has to be considered	Enum: 0: Used 1: Not used 2: Reserved 3: Not supported		
12	4	Room Size Status	RSS	Room size status	Enum: 0: < 25 m² 1: 25...50 m² 2: 50...75 m² 3: 75...100 m² 4: 100...125 m² 5: 125...150 m² 6: 150...175 m² 7: 175...200 m² 8: 200...225 m² 9: 225...250 m² 10: 250...275 m²		

					11: 275...300 m² 12: 300...325 m² 13: 325...350 m² 14: > 350 m² 15: Not supported
16	8	Not Used (= 0)			
24	8	Fan Speed Status	FSS	Fan speed	Enum: 0...100: 0...100% 101...254: Reserved 255: Not supported

D2-30: Floor Heating Controls and Automated Meter Reading

Floor heating controls and automated meter reading gateway may appear combined in one device, but the metering functionality can also be absent.

The floor heating control unit controls a number of valves for separate heating circuits (e.g. for separate heating of single rooms). It measures the common hot water supply temperature as well as the return water temperatures of each single circuit.

The automated meter reading gateway is a device that connects to various counters such as heating, water, gas or electrical energy meters. The meters may be connected to the gateway by one or several of these interface types: M-Bus, D0, S0 (see appendix). The gateway reports the continuous energy or flow volume meter reading of each of the connected metering devices. Typically the measured variables consist of a momentary value and an accumulated value. The transmission of separated consumption import and export values is supported, too.

Data exchange

Direction: bidirectional
Addressing: ADT inbound, broadcast outbound
Communication trigger: event- & time-triggered
Communication interval: minimum 1-1000 s, maximum 1000 s
Trigger event: heartbeat 1000 s, value change in "Position", "Return Temperature", "Status/Error", "Supply Temperature", "Meter Reading" while respecting the minimum reporting interval
Tx delay: 500 ms (maximum response time, first telegram)
Rx timeout: 0 ms (minimum time between two received messages)
Teach-in method: Universal teach-in (outbound)
Encryption required : no
Security level format : 0

EEP Family Table

Type	0x00	0x01	0x02	0x03	0x04	0x05	0x06
Number of heating channels/valves	4	8	8	8	8	6	12
Channel return temperature	X	X	X	X	X	-	-
Global return temperature	X	X	X	X	X	-	-
Global supply temperature	X	X	X	X	X	-	-
Number of supported MBUS meters	0	0	8	10	10	0	0
Number of supported S0 meters	0	0	0	0	1	0	0
Number of supported D0 meters	0	0	0	0	0	0	0

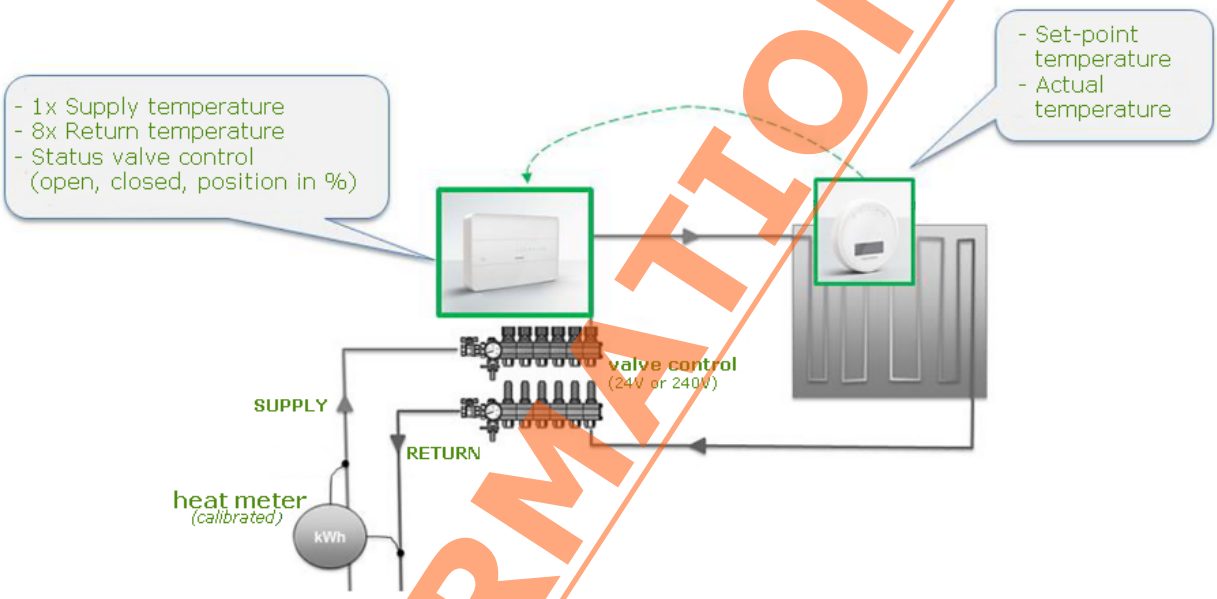
Description of the meter interfaces

S0-Interface:
The S0-Interface is a two-wire connection designed for the transmission of monotonously rising measurement data. The standard is defined in EN 62053-31. The meter device transmits a fixed number of pulses per physical meter unit. The number of pulses per unit is defined by the meter manufacturer and depends on the necessary precision of the meter system. The pulses are output as currency variations, where a value lower than 3 mA corresponds to a logical 0. The sender output is mostly realized by a transistor or an opto-coupler, which needs to be supplied by a voltage of 27-30 V. Polarity must be respected.

D0-Interface:
The D0-interface is an optical metering interface defined in EN62056-61. It allows the unidirectional readout of metering data at a rate of 9600 Baud, using telegrams with start bit, 7 data bits, parity and a stop bit. One of the protocols SML (Smart Message Language) or DLMS (Device Language Message Specification, EN62056-21) can be used for coding the data. A D0-Meter can deliver consumption data as well as various system data. The source and type of a data point is indicated by the standardized OBIS-codes.

MBUS-Interface:
The M-Bus (Meter-Bus) is a bidirectional field bus for the communication with consumption meters. It is described in standard EN13757. Typically there can be connected up to 250 devices in one M-Bus network. There is a common master in the network, who periodically collects the meter data from its slaves. The network may be implemented either as two-wire cable network allowing remote powering of the slaves or as wireless network. The protocol operates at 300 to 9600 Baud and codes the data bytes with start bit, 8 data bits, parity and a stop bit. The data records sent by a metering slave deliver in their header field the coding information of the following data field (value size, measurement medium, unit, multiplier). The master can address a single slave by its primary address (1…250), which must be assigned during network configuration, or by its secondary address, which is a unique device identification number assigned by the device manufacturer.

Application example for floor heating controls



References:
M-Bus documentation: www.m-bus.com
SML specification: www.vde.com/de/fnn/arbeitsgebiete/messwesen/Sym2/Seiten/default.aspx
DLMS User Association: www.dlms.com

RORG	D2	**VLD Telegram**
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	00	Type 0x00

Submitter: MSR-Solutions

CMD 0x1 - Set heating controls output

This message is sent to a floor heating actuator. It controls the valve position of one channel or of all channels of the floor heating controls.

Sender: controller; send type: broadcast or addressed; expected response: CMD 0x3

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit

0	4	Valve control period / PWM signal interval	PERIOD	Total on-off time for two-position valve controller (T valve open + T valve closed)	Enum: 0: Local default / no change 1: 1 s 2: 2 s 3: 5 s 4: 10 s 5: 20 s 6: 50 s 7: 100 s 8: 200 s 9: 500 s 10: 1000 s 11...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x01: ID 01		
8	2	Not Used (= 0)					
10	1	Valve type	VTYP	Type of connected valve	Enum: 0: Valve normally closed (N.C.) 1: Valve normally open (N.O.)		
11	5	Heating channel	HCH	The heating channel that should be set	Enum: 0...15: A valid channel number 16...30: Reserved 31: All valid channels		
16	1	Run init sequence	RIN	Measure and store the valve zero point	Enum: 0: No action 1: Run init sequence		
17	7	Valve position set point	POS	Valve set point 0…100% (0=closed, 100=open)	0...100	0...100	%

CMD 0x2 - Heating controls status query

This message is sent to a floor heating actuator. It requests the status of one channel or the status of the global control unit of an actuator.

Sender: controller; send type: broadcast or addressed; expected response: CMD 0x3

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x02: ID 02		
8	3	Not Used (= 0)					
11	5	Heating channel	HCH	The heating channel that should be reported	Enum: 0...15: A valid channel number 16...28: Reserved		

					29: All valid channels 30: All valid channels and global device status 31: Global device status only

CMD 0x3 - Heating controls status response / CH = 0...15

This message is sent by a floor heating controls if one of the following events occurs:
- Message 'status query' has been received (CMD 0x2).
- Status of one channel or temperature has changed.

Sender: actuator; send type: broadcast; maximum send delay 1 s.

If the response is for single channel data (CH = 0…15):

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x03: ID 03		
8	3	Status / Error	STATUS	Status / Error indication of given channel	Enum: 0: No fault 1: General error 2: Init sequence running 3: Channel not available 4: Temperature sensor error 5: Valve error 6: Temperature sensor and valve error 7: Reserved		
11	5	Heating channel	HCH	The heating channel that is reported	Enum: 0...15: A valid channel number 16...31: Reserved		
16	1	Not Used (= 0)					
17	7	Valve position	POS	Actual valve position 0…100% (0=closed, 100=open)	0...100	0...100	%
24	8	Return temperature	TEMPRET	The current return temperature of the channel	0...180	0...90	°C

CMD 0x3 - Heating controls status response / CH = 31

If the response is for global floor heating controls unit data (CH = 31):

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x03: ID 03		
8	3	Status / Error	STATUS	Global unit status	Enum: 0: No fault 1: General error		

					2: Supply temperature error 3: Return temperature error 4: Error on both sensors 5...7: Reserved		
11	5	Heating channel	HCH	The heating channel that is reported (=global unit)	Enum: 31: Unit status only		
16	8	Supply temperature	TSUP	The current supply temperature of the unit	0...180	0...90	°C
24	8	Return temperature	TRET	The current common return temperature	0...180	0...90	°C

CMD 0x6 - Set meter configuration / MBUS (BUS = 1)

This message is sent to a metering device gateway to configure the meter settings for one channel.

Sender: controller; send type: broadcast or addressed.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured)		

					1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
24	8	Primary Address	ADDR	The primary MBUS address of the meter	1...250	1...250	1
32	40	Not Used (= 0)					

CMD 0x6 - Set meter configuration / S0 (BUS = 2)

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured)		

					1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter
24	2	Factor of number of pulses	FACP	The factor for the number of pulses per value in UNIT1	Enum: 0: 1 1: 0.1 2: 0.01 3: 0.001
26	14	Number of pulses	NOP	The number of pulses per value in UNIT1* FACP	Enum: 0: Do not change the current setting of NOP 1...16383: Number of pulses per unit (EEP 2.6.5: **1 … 16383** ~~1 … 65535~~)
40	32	Preset value	RST	Preset the accumulated value to this value	Enum: 0...4294967294: New preset value 0xFFFFFFFF: Do not change the current value

CMD 0x6 - Set meter configuration / D0 (BUS = 3)

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh		

					2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter
24	8	D0 Protocol	PROT	The D0 protocol that should be used for that meter	Enum: 0: Auto detect 1: SML (Smart Message Language) 2: DLMS (Device Language Message Specification) 3...255: Reserved
32	40	Not Used (= 0)			

CMD 0x7 - Meter Status Query

This message is sent to a metering device gateway to query the status of a meter.
Sender: controller; send type: broadcast or addressed; expected response: CMD 0x8.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x07: ID 07		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus type that is queried	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter channel of given bus that status is queried	Enum: 0...30: Meter channel 31: All valid channels		

CMD 0x8 - Meter reading report / status response

This message is sent by a metering device gateway to report the meter values for each configured channel. It is sent if one of the following events occurs:
- Message 'meter status query' has been received (CMD 0x7)
- Status or meter reading of one channel has changed and auto reporting was configured by signal RM.

Sender: sensor; send type: broadcast; maximum send delay 1 s.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	3	Meter status / error	MSTAT	Meter channel status	Enum: 0: No fault 1: General error 2: Bus unconfigured 3: Bus unconnected 4: Bus shortcut 5: Communication timeout 6: Unknown protocol or configuration mismatch 7: Bus initialization running		
4	4	Command ID	CMD	Command identifier	Enum: 0x08: ID 08		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The used bus of the meter status response	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that status is reported	0...30	0...30	1
16	3	Not Used (= 0)					
19	2	Value selection	VSEL	The selection of the reported value	Enum: 0: Meter 1 Current value 1: Meter 1 Accumulated value 2: Meter 2 Current value 3: Meter 2 Accumulated value		
21	3	Value unit	VUNIT	The unit of the reported value	Enum: 0: W 1: Wh 2: kWh 3: m3/h 4: dm3/h 5: m3 6: dm3 7: 1 (digital counter)		
24	32	Meter reading value	VAL	The reported value	0...4294967295	0...4294967295	According to VUNIT

RORG	D2	VLD Telegram
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	01	Type 0x01 (description: see table)

See profile: D2-30-00

RORG	D2	VLD Telegram
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	02	Type 0x02 (description: see table)

See profile: D2-30-00

RORG	D2	VLD Telegram
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	03	Type 0x03 (description: see table)

See profile: D2-30-00

RORG	D2	VLD Telegram
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	04	Type 0x04 (description: see table)

See profile: D2-30-00

RORG	D2	VLD Telegram
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	05	Type 0x05 (description: see table)

See profile: D2-30-00

RORG	D2	VLD Telegram
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	06	Type 0x06 (description: see table)

See profile: D2-30-00

D2-31: Automated Meter Reading Gateway

The automated meter reading gateway is a device that connects to various counters such as heating, water, gas or electrical energy meters. The meters may be connected to the gateway by one or several of these interface types: M-Bus, D0, S0 (see appendix). The gateway reports the continuous energy or flow volume meter reading of each of the connected metering devices. Typically the measured variables consist of a momentary value and an accumulated value. The transmission of separated consumption import and export values is supported, too.

Data exchange

Direction: bidirectional
Addressing: ADT inbound, broadcast outbound
Communication trigger: event- & time-triggered
Communication interval: minimum 1-1000 s (configuration item), maximum 1000 s
Trigger event: heartbeat 1000 s, value change in “Status/Error”, “Meter Reading” while respecting the minimum reporting interval
Tx delay: 500 ms (maximum response time, first telegram)
Rx timeout: 0 ms (minimum time between two received messages)
Teach-in method: Universal teach-in (outbound)
Encryption required : no
Security level format : 0

Telegram Definition
The telegram definition is inherited from profile D2-30-xx and thus identical to the definition there.

EEP Family Table

Supported function	Type 0x00	Type 0x01
Number of supported MBUS meters	10	16
Number of supported S0 meters	2	0
Number of supported D0 meters	2	0

Description of the meter interfaces

S0-Interface:
The S0-Interface is a two-wire connection designed for the transmission of monotonously rising measurement data. The standard is defined in EN 62053-31. The meter device transmits a fixed number of pulses per physical meter unit. The number of pulses per unit is defined by the meter manufacturer and depends on the necessary precision of the meter system. The pulses are output as currency variations, where a value lower than 3 mA corresponds to a logical 0. The sender output is mostly realized by a transistor or an opto-coupler, which needs to be supplied by a voltage of 27-30 V. Polarity must be respected.

D0-Interface:
The D0-interface is an optical metering interface defined in EN62056-61. It allows the unidirectional readout of metering data at a rate of 9600 Baud, using telegrams with start bit, 7 data bits, parity and a stop bit. One of the protocols SML (Smart Message Language) or DLMS (Device Language Message Specification, EN62056-21) can be used for coding the data. A D0-Meter can deliver consumption data as well as various system data. The source and type of a data point is indicated by the standardized OBIS-codes.

MBUS-Interface:
The M-Bus (Meter-Bus) is a bidirectional field bus for the communication with consumption meters. It is described in standard EN13757. Typically there can be connected up to 250 devices in one M-Bus network. There is a common master in the network, who periodically collects the meter data from its slaves. The network may be implemented either as two-wire cable network allowing remote powering of the slaves or as wireless network. The protocol operates at 300 to 9600 Baud and codes the data bytes with start bit, 8 data bits, parity and a stop bit. The data records sent by a metering slave deliver in their header field the coding information of the following data field (value size, measurement medium, unit, multiplier). The master can address a single slave by its primary address (1…250), which must be assigned during network configuration, or by its secondary address, which is a unique device identification number assigned by the device manufacturer.

References:
M-Bus documentation: www.m-bus.com
SML specification: www.vde.com/de/fnn/arbeitsgebiete/messwesen/Sym2/Seiten/default.aspx
DLMS User Association: www.dlms.com

RORG	D2	VLD Telegram
FUNC	31	Automated Meter Reading Gateway
TYPE	00	Type 0x00

Submitter: MSR-Solutions

CMD 0x6 - Set meter configuration / MBUS (BUS = 1)

This message is sent to a metering device gateway to configure the meter settings for one channel.

Sender: controller; send type: broadcast or addressed.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					

9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
24	8	Primary Address	ADDR	The primary MBUS address of the meter	1...250	1...250	1
32	40	Not Used (= 0)					

CMD 0x6 - Set meter configuration / S0 (BUS = 2)

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					

9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
24	2	Factor of number of pulses	FACP	The factor for the number of pulses per value in UNIT1	Enum: 0: 1 1: 0.1 2: 0.01 3: 0.001		
26	14	Number of pulses	NOP	The number of pulses per value in UNIT1* FACP	Enum: 0: Do not change the current setting of NOP 1...16383: Number of pulses per unit (EEP 2.6.5: **1 … 16383** ~~1 … 65535~~)		
40	32	Preset value	RST	Preset the accumulated value to this value	Enum: 0...4294967294: New preset value 0xFFFFFFFF: Do not change the current value		

CMD 0x6 - Set meter configuration / D0 (BUS = 3)

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit

0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
24	8	D0 Protocol	PROT	The D0 protocol that should be used for that meter	Enum: 0: Auto detect 1: SML (Smart Message Language) 2: DLMS (Device Language Message Specification) 3...255: Reserved		
32	40	Not Used (= 0)					

CMD 0x7 - Meter Status Query

This message is sent to a metering device gateway to query the status of a meter.
Sender: controller; send type: broadcast or addressed; expected response: CMD 0x8.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x07: ID 07		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus type that is queried	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter channel of given bus that status is queried	Enum: 0...30: Meter channel 31: All valid channels		

CMD 0x8 - Meter reading report / status response

This message is sent by a metering device gateway to report the meter values for each configured channel. It is sent if one of the following events occurs:
- Message 'meter status query' has been received (CMD 0x7)
- Status or meter reading of one channel has changed and auto reporting was configured by signal RM.

Sender: sensor; send type: broadcast; maximum send delay 1 s.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	3	Meter status / error	MSTAT	Meter channel status	Enum: 0: No fault 1: General error 2: Bus unconfigured 3: Bus unconnected 4: Bus shortcut 5: Communication timeout 6: Unknown protocol or configuration mismatch 7: Bus initialization running		
4	4	Command ID	CMD	Command identifier	Enum: 0x08: ID 08		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The used bus of the meter status response	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that status is reported	0...30	0...30	1
16	3	Not Used (= 0)					
19	2	Value selection	VSEL	The selection of the reported value	Enum: 0: Meter 1 Current value 1: Meter 1 Accumulated value 2: Meter 2 Current value 3: Meter 2 Accumulated value		

21	3	Value unit	VUNIT	The unit of the reported value	Enum: 0: W 1: Wh 2: kWh 3: m3/h 4: dm3/h 5: m3 6: dm3 7: 1 (digital counter)		
24	32	Meter reading value	VAL	The reported value	0...4294967295	0...4294967295	According to VUNIT

RORG	D2	VLD Telegram
FUNC	31	Automated Meter Reading Gateway
TYPE	01	Type 0x01 (description: see table)

See profile: D2-31-00

D2-32: A.C. Current Clamp

Description
A family of EEP's based on a central unit where up to three a.c. Current Clamps can be connected. Each one capable of energy harvesting sufficiently to enable readings of current values to be taken in amps and transmitted every 30 seconds.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: time-triggered
Communication interval: 30 seconds
Trigger event: Threshold Voltage for Power Fail transmission bit
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: Universal teach-in (UTE)

Security
Encryption supported: no
Security level format: -

EEP Family Table:

Supported function	Type 00	Type 01	Type 02
Channel 1	X	X	X
Channel 2	-	X	X
Channel 3	-	-	X

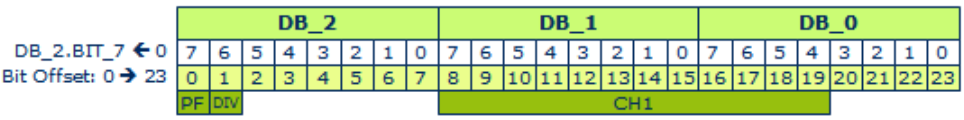
Each TYPE has to support every parameter that is marked in its column!

The list of parameters could be structured following the features that always include a certain group of parameters.

RORG	D2	VLD Telegram
FUNC	32	A.C. Current Clamp
TYPE	00	Type 0x00

Submitter: Pressac Communications Ltd

Type 00



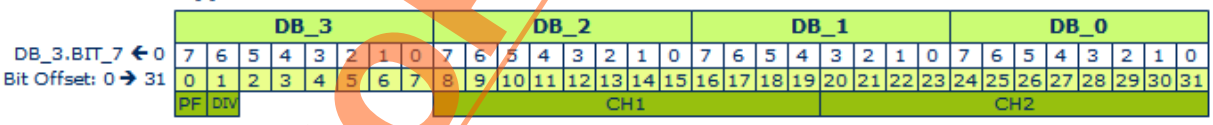
Notes
1) If Power Fail bit is set, all channel readings will be set to zero when this final telegram is sent.
2) Scale/divisor is set to 0 or 1 for all channels only, not individually.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Power Fail	PF	See Note 1	Enum: 0: False 1: True		
1	1	Divisor	DIV	Divisor for all channels	Enum: 0: x/1 1: x/10		
2	6	Not Used (= 0)					
8	12	Channel 1	CH1	Current value	0...0xFFF	0...4095 (409,5)	A
20	4	Not Used (= 0)					

RORG	D2	VLD Telegram
FUNC	32	A.C. Current Clamp
TYPE	01	Type 0x01

Submitter: Pressac Communications Ltd

Type 01



Notes
1) If Power Fail bit is set, all channel readings will be set to zero when this final telegram is sent.
2) Scale/divisor is set to 0 or 1 for all channels only, not individually.

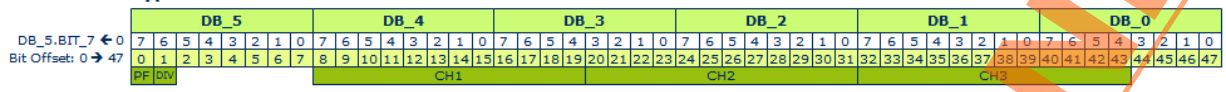
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Power Fail	PF	See Note 1	Enum: 0: False 1: True		
1	1	Divisor	DIV	Divisor for all channels	Enum: 0: x/1 1: x/10		
2	6	Not Used (= 0)					
8	12	Channel 1	CH1	Current value	0...0xFFF	0...4095 (409,5)	A
20	12	Channel 2	CH2	Current value	0...0xFFF	0...4095 (409,5)	A

RORG	D2	VLD Telegram

FUNC	32	A.C. Current Clamp
TYPE	02	Type 0x02

Submitter: Pressac Communications Ltd

Type 02



Notes
1) If Power Fail bit is set, all channel readings will be set to zero when this final telegram is sent.
2) Scale/divisor is set to 0 or 1 for all channels only, not individually.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Power Fail	PF	See Note 1	Enum: 0: False 1: True		
1	1	Divisor	DIV	Divisor for all channels	Enum: 0: x/1 1: x/10		
2	6	Not Used (= 0)					
8	12	Channel 1	CH1	Current value	0...0xFFF	0...4095 (409,5)	A
20	12	Channel 2	CH2	Current value	0...0xFFF	0...4095 (409,5)	A
32	12	Channel 3	CH3	Current value	0...0xFFF	0...4095 (409,5)	A
44	4	Not Used (= 0)					

D2-33: Intelligent, Bi-directional Heaters and Controllers

Submitter: WATTS Electronics

Description
This profile is used for all ADEO electric heaters (replacing pilot wire control) in scope of global comfort management in the home through a central processing unit. This includes temperature setpoint control based on a series of embedded sensors on the heater. Temperature management can also be tuned by an external temperature sensor input.

Data exchange
Direction: bidirectional
Addressing: addressed
Communication trigger: time-triggered (10 min +/- 3 min) and event based
Communication interval: 10 min +/- 5 min
Trigger event: defined in section 2. Typical emitter/receiver rules
Tx delay: 200 ms
Rx timeout: 1 s

Teach-in
UTE Bidirectional Teach-In / Teach-Out is used.
The device is set in pairing mode via manual on-screen set-up, then the gateway send unicast pairing message to the device with known unique ID of the heater.

Security
Encryption supported: yes
Security level format: RLC, CMAC, VAES

VLD Family Table:

Supported function	Type 00
Program (command: MID = 2)	X
Time and date (command: MID = 3)	X

Pilot wire flag	X
Window open detection	X
PIR detection	X
Reference temperature	X
Derogation	X
COV Sensor	-
CO sensor	-
CO2 sensor	-
Particles 1 sensor	-
Particles 2.5 sensor	-
Particles 10 sensor	-
Radio activity sensor	-
Sound sensor	-
Hydrometry sensor	-
Air moving sensor	-
Pressure sensor	-
Temperature scale status	X
Time notation status	X
Display content status	X

This shows the different commands and data fields which can be supported by different profiles of this VLD family. If a field is not supported, it's value shall always be transmitted as 0.

Rules for the communications

1) ACKNOWLEDGE mechanism

The gateway can request information from the heater via the "Request" message (MID = 0) but it can also send pure information to the heater based on gateway/user events without any request for status (MID = 0 to 3). Conversely, the heater can request information from the gateway via the "request and status" message (MID = 8) but also send pure information based on heater/user events (MID = 8 to 12).

The below table describes the expected ACKNOWLEDGE frames for each type of initiated message:

Message type	Initiator gateway		Target heater acknowledge	
	MID	REQ	MID	REQ
Request status	0	8	8	15
Request param	0	9	9	N.A.
Request sensor1	0	10	10	N.A.
Request sensor2	0	11	11	N.A.
Request sensor3	0	12	12	N.A.
Event DATA	0	13	8	15
Reserved	0	14	N.A.	N.A.
N.A.	0	15	N.A.	N.A.
Event DATA	1→3	N.A.	8	15

Message type	Initiator heater		Target gateway acknowledge	
	MID	REQ	MID	REQ
Request external temp	8	0	0	15
Request sensor param	8	1	1	N.A.
Request program	8	2	2	N.A.
Request time & date	8	3	3	N.A.
Event DATA	8	4	0	15
Reserved	8	5→14	N.A.	N.A.
N.A.	8	15	N.A.	N.A.
Event DATA	9→13	N.A.	0	15

2) Typical emitter/receiver rules

Emitter	Message Type	Receiver	Message sent by the receiver
Gateway	Request	Heater	Answers Request
Gateway	Data	Heater	Answer Acknowledge

Emitter	Message Type	Receiver	Message sent by the receiver
Heater	Request	Gateway	Answers Request
Heater	Data	Gateway	Answer Acknowledge

Device send Heater message when:

- Heater has to respond to gateway
- Heater is entering Derogation Mode (manual entry on the device's screen)
- All 30 min +/- 10% (random value)
- Key lock user (KLU) function is activated on the device
- Any sensor is triggered:
  - Windows detection triggered
  - PIR sensor triggered
  - CO2 limit reached => 1000ppm
  - CO limit reached
  ..... => 9 ppm (CO Max prolonged exposure – ASHRAE std)
  ..... =>< 1.0 ppm = Good, or "Green"
  ..... 1.0 to 10 ppm = Marginal, or "Yellow
  ..... 10 ppm and higher = Poor, or "Red"
  - Particles Limit reached:
  ..... P1V => 10µg/m3
  ..... P2V => 25µg/m3 (EU regulation)
  ..... P10V => 40µg/m3 (EU regulation)
  - Radioactivity Limit reached => 16 mSv
  - Hygrometry Limit reached => >75%
  - Temperature Variation: significant changes thresholds for slope detection with 10% random:
  ..... 0,5°C/3min +- 10%
  ..... 0,4°C/5min +- 10%
  ..... 0,3°C/8min +- 10%
  ..... 0,2°C/15min +- 10%
  ..... 0,1°C/30min +- 10%
  - Sound level Limit reached => 20 dB
  - Pressure level Limit reached =
  ..... >< 980hPa = cyclonic weather
  ..... 1030hPa = anticyclonic weather
  - Air moving Limit reached =>
  ..... > 0,15 m/s @ 19°C
  ..... > 0,16 m/s @ 20°C
  ..... > 0,17 m/s @ 21°C
  ..... > 0,18 m/s @ 22°C
  ..... > 0,21 m/s @ 24°C
  ..... > 0,25 m/s @ 26°C
- Error flag triggered
- Pilot wire change

Gateway sends message when:

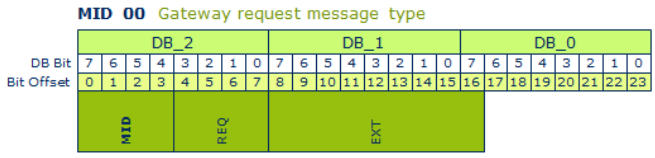
- It's needed regarding applications and functionalities. (e.g. gateway start-up)
- When Gateway receives Heater message from a device.
- In case of Program request, Gateway has to send all programs to heaters.

RORG	D2	VLD Telegram
FUNC	33	Intelligent, Bi-directional Heaters and Controllers
TYPE	00	Type 0x00

Submitter: WATTS Electronics

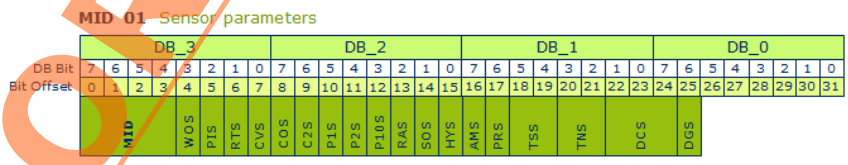
1) Gateway messages
There are four different messages which can be used to transmit data to heaters:

1a) Gateway request message type
Used to send external temperatures to heaters and ask for special requests.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Message Identifier	MID	Defines the type of message	Enum: 0: Gateway request message type		
4	4	Request Frame	REQ	Request information to the heater	Enum: 0...7: Reserved 8: Question: status and flags 9: Question: parameters heaters 10: Question: sensor CO/HYGRO/Sound 11: Question: sensor particle/radioactivity 12: Question: sensor air flow, hygrometry, pressure and temperature 13: Information to heater 14: Reserved 15: Acknowledge frame		
8	9	External Temperature	EXT	Recent external temperature: Temp(°C) = value / 10	1...500	0.1...50.0	°C
17	7	Not Used (= 0)					

1b) Sensor parameters
This command is transmitted by the gateway controller to enable/disable a sensor. If a sensor is disabled, no measurement will be taken and the corresponding data field will be set to 0 to indicate that the sensor is disabled. For any fields that are not supported, as indicated in the VLD family table above, 0 shall be transmitted in the corresponding field of the sensor parameters message. Only the supported fields are valid for each EEP and the rest should be ignored on the heater side.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit

0	4	Message Identifier	MID	Defines the type of message	Enum: 1: Sensor parameters
4	1	Window Open Detection Status	WOS	Indicates if the open window detection is active	Enum: 0: Disabled 1: Enabled
5	1	PIR Detection Status	PIS	Indicates if the PIR function is active	Enum: 0: Disabled 1: Enabled
6	1	Reference Temperature Status	RTS	Indicates which temperature has to be used	Enum: 0: Disabled 1: Enabled
7	1	COV Sensor	CVS	Indicate if COV sensor is active	Enum: 0: Disabled 1: Enabled
8	1	CO Sensor	COS	Indicate if CO sensor is active	Enum: 0: Disabled 1: Enabled
9	1	CO2 Sensor	C2S	Indicate if CO2 sensor is active	Enum: 0: Disabled 1: Enabled
10	1	Particles 1 Sensor	P1S	Indicate if particles 1 sensor is active	Enum: 0: Disabled 1: Enabled
11	1	Particles 2.5 Sensor	P2S	Indicate if particles 2.5 sensor is active	Enum: 0: Disabled 1: Enabled
12	1	Particles 10 Sensor	P10S	Indicate if particles 10 sensor is active	Enum: 0: Disabled 1: Enabled
13	1	Radio Activity Sensor	RAS	Indicate if radio activity sensor is active	Enum: 0: Disabled 1: Enabled
14	1	Sound Sensor	SOS	Indicate if sound sensor is active	Enum: 0: Disabled 1: Enabled
15	1	Hygrometry Sensor	HYS	Indicate if hygrometry sensor is active	Enum: 0: Disabled 1: Enabled
16	1	Air Moving Sensor	AMS	Indicate if air moving sensor is active	Enum: 0: Disabled 1: Enabled
17	1	Pressure Sensor	PRS	Indicate if pressure sensor is active	Enum: 0: Disabled 1: Enabled
18	2	Temperature Scale Status	TSS	Defines the used temperature scale for the room control panel display and menus	Enum: 0: No change 1: Default 2: °Celsius 3: °Fahrenheit
20	2	Time Notation Status	TNS	Defines the used time notation	Enum: 0: No change 1: Default 2: 24 h 3: 12 h
22	3	Display Content Status	DCS	Defines the main display content	Enum: 0: No change 1: Default 2: Time

					3: Room temperature (internal) 4: Room temperature (external) 5: Temperature setpoint 6: Display off 7: Reserved
25	1	Derogation Status	DGS	Indicates if the derogation is allowed	Enum: 0: Derogation is not allowed 1: Derogation is allowed
26	6	Not Used (= 0)			

1c) Program
Use to define scheduling (timeslot + setpoint temperature) for all week.

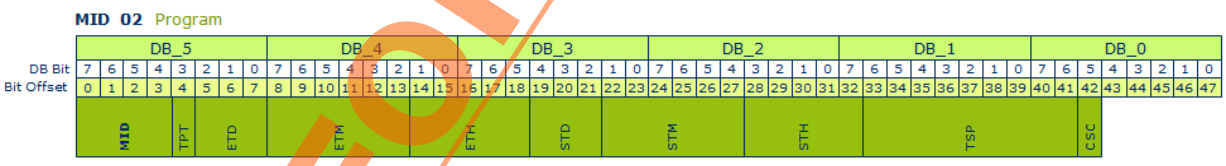
To set a continuous loop over several weeks with the same setpoint temperature (Non timed mode), the gateway must send the following configuration: (as Comfort/Reduce)
- Send in One time mode
- Monday 00:00 to Monday 00:00 (Start = Stop)
- Set point: in Celcius

If start time = stop time, the stop time isn't taken into account and in this case the One time timeslot is a "forever" loop.

To send a full new weekly schedule, the gateway must sequentially send all timeslots with the desired setpoint temperature.

Priority: On Time information has higher priority than weekly information. In case of non-information for one time and weekly, the heater is in stop mode.

Warning: When both the CSC and TPT fields are set to 1, all scheduling programs (one time and weekly) of the heater are cleared.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Message Identifier	MID	Defines the type of message	Enum: 2: Program		
4	1	Scheduled Order Type	TPT	Type of provided schedule order	Enum: 0: One time 1: Weekly		
5	3	End Time Day	ETD	The end day to apply the provided scheduled order	Enum: 0: Monday 1: Tuesday 2: Wednesday 3: Thursday 4: Friday 5: Saturday 6: Sunday 7: Reserved		

8	6	End Time Minute	ETM	The end time (minute) to apply the provided scheduled order	0...59	0...59	Min
14	5	End Time Hour	ETH	The end time (hour) to apply the provided scheduled order	0...23	0...23	Hour
19	3	Start Time Day	STD	The start day to apply the provided scheduled order	Enum: 0: Monday 1: Tuesday 2: Wednesday 3: Thursday 4: Friday 5: Saturday 6: Sunday 7: Reserved		
22	6	Start Time Minute	STM	The start time (minute) to apply the provided scheduled order	0...59	0...59	Min
28	5	Start Time Hour	STH	The start time (hour) to apply the provided scheduled order	0...23	0...23	Hour
33	9	Temperature Setpoint	TSP	The temperature setpoint to apply the provided scheduled order: Setpoint(°C) = value / 10	1...500	0.1...50.0	°C
42	1	Clear Schedule	CSC	Allow to clear Weekly or one time	Enum: 0: Set 1: Clear		
43	5	Not Used (= 0)					

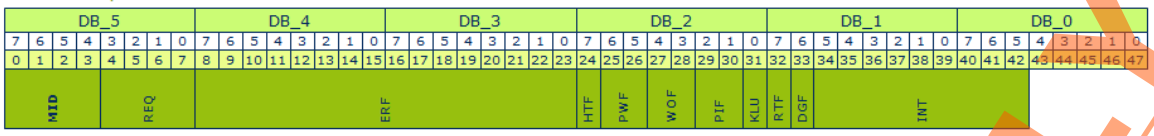
1d) Time and date
Use to define Time and date for heaters.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Message Identifier	MID	Defines the type of message	Enum: 3: Time and date		
4	5	Day	DAY	Date format: YYYY/MM/DD	1...31	1...31	Day
9	4	Month	MON	Date format: YYYY/MM/DD	1...12	1...12	Mon
13	12	Year	YR	Date format: YYYY/MM/DD	0...4095	0...4095	Year
25	6	Minute	MIN	Time format: hh:mm	0...59	0...59	Min
31	5	Hour	HR	Time format: hh:mm	0...23	0...23	Hour
36	3	Day Week	DAYW	Day of week	Enum: 0: Monday 1: Tuesday 2: Wednesday 3: Thursday 4: Friday 5: Saturday 6: Sunday 7: Reserved		
39	1	Not Used (= 0)					

2) Heater message
5 different messages to communicate data to Gateway:

2a) Request and status
Ask for special data from gateway and send actual status of product.

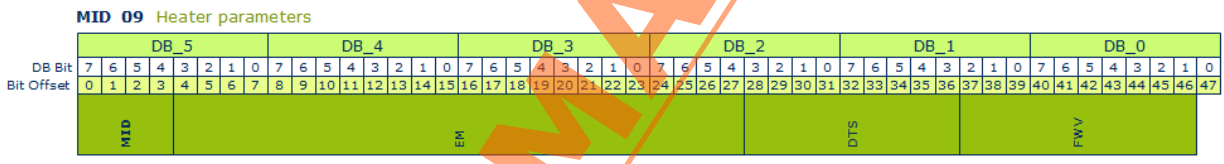
MID 08 Request and status



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Message Identifier	MID	Defines the type of message	Enum: 8: Request and status		
4	4	Request Frame	REQ	Ask information from heater	Enum: 0: Question External Temp. 1: Question Sensor parameters 2: Question Program 3: Question Time and date 4: Information to gateway 5...7: Reserved 8...14: Reserved for gateway frame 15: Acknowledge frame		
8	16	Error Flag	ERF	Indicates the errors occurred	Enum: 0: Temperature sensor is open 1: Temperature sensor is Short circuit 2: Temperature measured is greater than 50°C 3: Error between internal temp and external temp is greater than 4°C 4: Reserved 5: Reserved 6: Reserved 7: Reserved 8: Reserved 9: Reserved 10: Reserved 11: Reserved 12: Reserved 13: Reserved 14: Reserved 15: Reserved		
24	1	Heating Flag	HTF	Indicates if the heater is heating the room	Enum: 0: No heating up 1: Heating up		
25	2	Pilot Wire Flag	PWF	Indicates the status of the pilot wire	Enum: 0: No pilot wire 1: Pilot wire active 2: Pilot wire -1 3: Pilot wire -2		

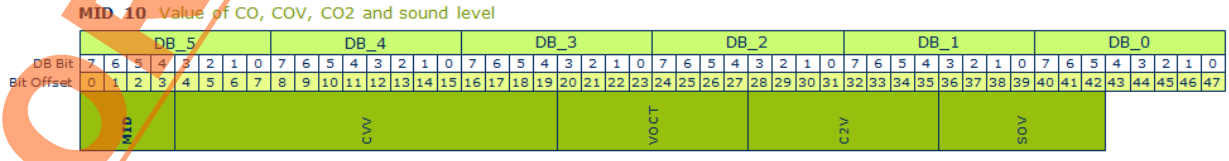
27	2	Window Open Detection Flag	WOF	Indicates if an open window is detected	Enum: 0: Disabled 1: Close 2: Open 3: Reserved		
29	2	PIR Flag	PIF	Indicates if the PIR detected a movement	Enum: 0: Disabled 1: No movement detected 2: Movement detected 3: Reserved		
31	1	Key Lock User Status	KLU	Indicates if the children protection is active or not	Enum: 0: Key Lock is disabled 1: Key Lock is enabled		
32	1	Reference Temperature Flag	RTF	Indicates which temperature is used	Enum: 0: Internal 1: External		
33	1	Derogation Flag	DGF	Indicates the status of the derogation	Enum: 0: No derogation 1: Derogation active		
34	9	Internal Temperature	INT	Recent internal temperature: Temp(°C) = value / 10	1...500	+0.1...+50.0	°C
43	5	Not Used (= 0)					

2b) Heater parameters
Use by gateway to know Energy, Setpoint in derogation mode and firmware version.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Message Identifier	MID	Defines the type of message	Enum: 9: Heater parameters		
4	24	Energy Measurement	EM	Total amount of energy consumed Energy(KWh) = value / 10	0...16777215	0...1677721	kWh
28	9	Derogation Temperature Setpoint	DTS	The temperature setpoint set with the derogation: Setpoint(°C) = value / 10	1...500	+0.1...+50.0	°C
37	10	Firmware Version	FWV	Give the version of the firmware	0...1024	0...1024	-
47	1	Not Used (= 0)					

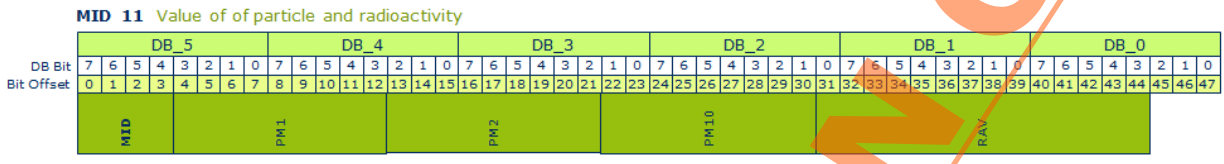
2c) Value of CO, COV, CO2 and sound level
Use by gateway to know value of CO, COV, CO2 and sound level.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit

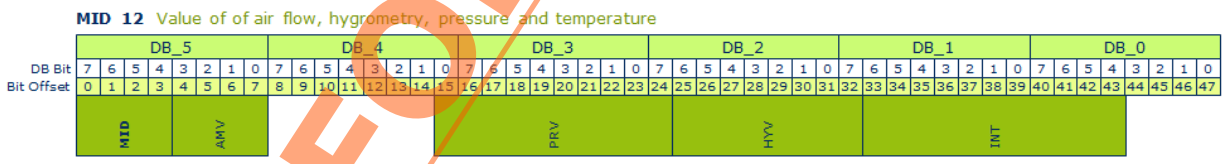
0	4	Message Identifier	MID	Defines the type of message	Enum: 10: Value of CO, COV, CO2 and sound level		
4	16	COV Value	CVV	COV value in ppb	1...65535	1...65535	ppb
20	8	CO Value	VOCT	CO value in ppm	1...255	1...255	ppm
28	8	CO2 Value	C2V	CO2 value in ppm	1...255	10...2550	ppm
36	7	Sound Value	SOV	Sound value in dB	1...127	1...127	dB
43	5	Not Used (= 0)					

2d) Value of particles and radioactivity sensors
Use by gateway to know value of particle and radioactivity.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Message Identifier	MID	Defines the type of message	Enum: 11: Value of particles and radioactivity sensors		
4	9	Particle 1 Value	PM1	Particle 1 value in µg/m3	1...511	1...511	µg/m3
13	9	Particle 2 Value	PM2	Particle 2 value in µg/m3	1...511	1...511	µg/m3
22	9	Particle 10 Value	PM10	Particle 10 value in µg/m3	1...511	1...511	µg/m3
31	14	Radioactivity Value	RAV	Radioactivity value In µSv/h	1...16383	0.01...163.83	µSv/h
45	3	Not Used (= 0)					

2e) Value of air flow, hygrometry, pressure and temperature
Use by gateway to know value of air flow, hygrometry, pressure and temperature.



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Message Identifier	MID	Defines the type of message	Enum: 12: Value of air, hygro., pressure and temp.		
4	4	Air Moving	AMV	Air moving value in m/s	1...15	1...15	m/s
8	7	Not Used (= 0)					
15	10	Pressure Value	PRV	Pressure value in hPa	1...1023	500...1150	hPa
25	8	Hygrometry Value	HYV	Hygrometry value in %	1...200	1...100	%
33	11	Internal Temperature	INT	Recent internal temperature: Temp(°C) = value / 10	1...500	+0.1...+50.0	°C
44	4	Not Used (= 0)					

D2-34: Heating Actuator

Submitter: AWAG Elektrotechnik AG

Description
The profile is used to monitor and control a simple heating actuator. The actuator compares the current room temperature with a target temperature (set point) and accordingly switches on and off the heating.

The set point is either taken from a room operating panel (see A5-10-xx profiles) or can be configured by a radio command. A specific set point can be set as well as a relative shift to the panel value. The override can be temporary or permanent.

Data exchange

1. Status update on heartbeat or opmode change:
Direction: unidirectional
Addressing: broadcast
Communication trigger: heartbeat or operation mode change
Communication interval: heartbeat configurable: off / 30 sec / 3 min
Trigger event: opmode change or heartbeat
Tx delay: n/a
Rx timeout: n/a

2. Status response and set point response are replies to the corresponding requests. A request for all channels results in a separate reply for each channel:
Direction: bidirectional
Addressing: unicast (ADT)
Communication trigger: request
Communication interval: n/a
Trigger event: n/a
Tx delay: 500 ms
Rx timeout: 500 ms

3. Set point configuration is a unconfirmed request (per channel). Success can be determined by a set point query:
Direction: unidirectional
Addressing: unicast (ADT)
Communication trigger: request
Communication interval: n/a
Trigger event: n/a
Tx delay: n/a
Rx timeout: n/a

Teach-in
Teach-in method: Universal teach-in (UTE)

Security
Encryption supported: no
Security level format: -

VLD Family Table:
Each TYPE has to support every command / parameter that is marked in its column!

Supported command	Type 00	Type 01	Type 02
No. of output channels	1	2	8
Status broadcast	X	X	X
Query/Reply status	X	X	X
Configure set point	X	X	X
Query/Reply set point	X	X	X

Supported parameter	Type 00	Type 01	Type 02
Current room temperature	X	X	X
Currently active set point	X	X	X
Panel set point	X	X	X
Operation mode	X	X	X
Set point configuration	X	X	X
Set point override value	X	X	X
Set point shift value	X	X	X
Set point override duration	X	X	X

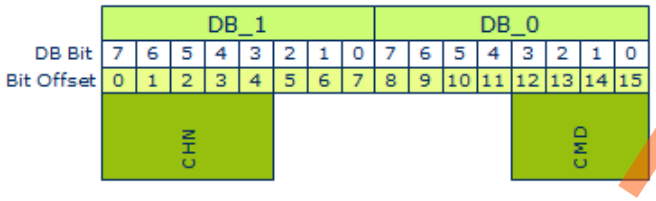
The list of parameters could be structured following the features that always include a certain group of parameters.

Appendix:
Depending on the value of CFG, the set point is evaluated differently:
0: Current set point = room panel value
... SHF, OVR and DUR are ignored
1: Current set point = OVR
... SHF is ignored, fallback to room panel value after DUR
2: Current set point = room panel value + SHF
... OVR is ignored, fallback to room panel value after DUR
3: Current set point = room panel value - SHF
... OVR is ignored, fallback to room panel value after DUR

RORG	D2	VLD Telegram
FUNC	34	Heating Actuator
TYPE	00	1 Output Channel

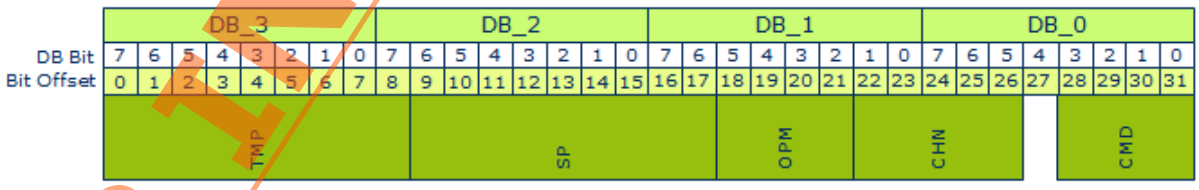
Submitter: AWAG Elektrotechnik AG

CMD 0x3 – Actuator Status Query



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	5	Channel	CHN	Channel address	Enum: 0x00...0x1D: 1...30 CHN 0x1E: All channels supported by the device 0x1F: Not used		
5	7	Not Used (= 0)					
12	4	Command ID	CMD	Command identifier	Enum: 3: Status query command		

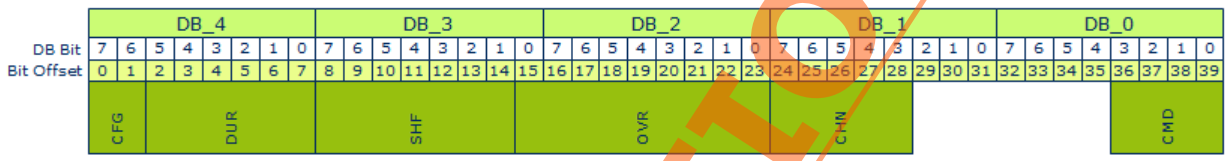
CMD 0x4 – Actuator Status Response



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	9	Temperature	TMP	Current room temperature	Enum: 0...400: 0...+40 °C 0x1FF: Unknown		
9	9	Set point	SP	Currently active set point	0...400	0...+40	°C

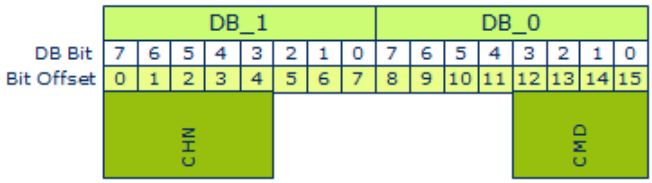
18	4	Operation Mode	OPM	Current mode valid for the channel	Enum: 0x0: Off (deactivated) 0x1: Temperature unknown 0x2: No heating required 0x3: Heating required 0x4...0xF: Not used
22	5	Channel	CHN	Channel address	Enum: 0x00...0x1D: 1...30 CHN 0x1E: All channels supported by the device 0x1F: Not used
27	1	Not Used (= 0)			
28	4	Command ID	CMD	Command identifier	Enum: 4: Status response command

CMD 0x5 – Actuator Set Point Configuration



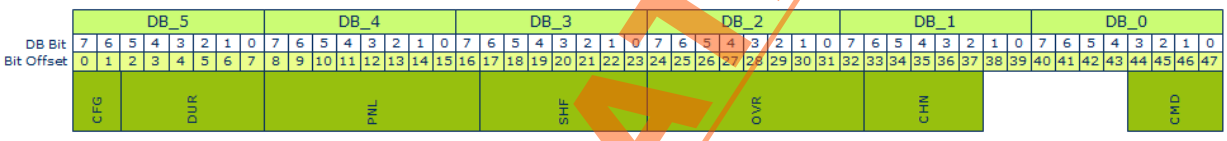
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	2	Configuration	CFG	How set point is evaluated (see appendix)	Enum: 0: Room panel value 1: Override with OVR 2: Add SHF to panel value 3: Subtract SHF from panel value		
2	6	Duration	DUR	Duration of the override until fallback to room panel value	Enum: 0: Endless 1...63: h 1...63		
8	7	Set point	SHF	Set point shift value	0...100	0...10	K
15	9	Set point	OVR	Set point override value	0...400	0...+40	°C
24	5	Channel	CHN	Channel address	Enum: 0x00...0x1D: 1...30 CHN 0x1E: All channels supported by the device 0x1F: Not used		
29	7	Not Used (= 0)					
36	4	Command ID	CMD	Command identifier	Enum: 5: Set point configuration command		

CMD 0x6 – Actuator Set Point Query



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	5	Channel	CHN	Channel address	Enum: 0x00...0x1D: 1...30 CHN 0x1E: All channels supported by the device 0x1F: Not used		
5	7	Not Used (= 0)					
12	4	Command ID	CMD	Command identifier	Enum: 6: Set point query command		

CMD 0x7 – Actuator Set Point Response



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	2	Configuration	CFG	How set point is evaluated (see appendix)	Enum: 0: Room panel value 1: Override with OVR 2: Add SHF to panel value 3: Subtract SHF from panel value		
2	6	Duration	DUR	Remaining override time until fallback to room panel value	Enum: 0: Expired (CFG = 0) 1...63: h 1...63		
8	9	Set point	PNL	Set point provided by room panel	0...400	0...+40	°C
17	7	Set point	SHF	Set point shift value	0...100	0...10	K
24	9	Set point	OVR	Set point override value	0...400	0...+40	°C
33	5	Channel	CHN	Channel address	Enum: 0x00...0x1D: 1...30 CHN 0x1E: All channels supported by the device 0x1F: Not used		
38	6	Not Used (= 0)					
44	4	Command ID	CMD	Command identifier	Enum: 7: Set point response command		

RORG	D2	VLD Telegram
FUNC	34	Heating Actuator

TYPE	01	2 Output Channels

Submitter: AWAG Elektrotechnik AG

See profile: D2-34-00

RORG	D2	VLD Telegram
FUNC	34	Heating Actuator
TYPE	02	8 Output Channels

Submitter: AWAG Elektrotechnik AG

See profile: D2-34-00

D2-40: LED Controller Status

Description
This family of EEP's is used for sending handling a LED controller device. The status is send periodically, or after product specific event occurred e.g. when one of the parameters from the status message has changed. It allows other devices to monitor LED controller and react to its actions.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event- & time-triggered
Communication interval: configurable
Trigger event: heartbeat, change of one of the parameters from the status message
Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: Universal teach-in (UTE)

Security
Encryption supported: no
Security level format: -

EEP Family Table:

Supported function	Type 00	Type 01
MsgId	X	X
LED output enabled	X	X
"Demand Response" mode Active	X	X
Daylight Harvesting	X	X
Occupancy state	X	X
Status Tx reason	X	X
Current Dim Level	X	-
Current Dim Level LED R	-	X
Current Dim Level LED G	-	X
Current Dim Level LED B	-	X

Each TYPE has to support every parameter that is marked in its column!

"LED output enabled" parameter is correlated with dimming level – it is set to ENABLE if dimming level is above 0%. 0% dimming level means that the light is completely OFF.

LED controller has a "Demand Response" feature. When DR mode is triggered by external device, "Demand Response" mode Active will be set to TRUE.

Daylight Harvesting feature of the LED controller is also triggered by the external sensor.

Occupancy state is change by occupancy sensor taught in to the LED controller.

DR, Daylight Harvesting, and Occupancy will influence dimming levels, with an algorithm specific to the device that sends the status message.

RORG	D2	VLD Telegram
FUNC	40	LED Controller Status
TYPE	00	Type 0x00

Submitter: EnOcean GmbH

MsgId 0x00: Status of monocolor LED controller

MsgId 0x00

DB_1.BIT_7 ← 0	DB_1								DB_0							
Bit Offset: 0 → 15	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	OUTEN	DRA	DHAR	OCC		SREAS	MI		DLVL							

monocolor LED

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	LED output enabled	OUTEN	Driving LED enabled	Enum: 0: Disabled 1: Enabled		
1	1	"Demand Response" mode Active	DRA	Controller is in the DR mode. It had received a DR command from DR controller, and it is executing it.	Enum: 0: False 1: True		
2	1	Daylight Harvesting Active	DHAR	Daylight harvesting feature is turned on. Readings from photo sensor are influencing the dimming level.	Enum: 0: False 1: True		
3	2	Occupancy State	OCC	Room which controller is in charge of is considered occupied.	Enum: 0: Not occupied 1: Occupied 2: Unknown		
5	1	Status Tx reason	SREAS	Reason for sending this status message	Enum: 0: Other 1: Heartbeat		
6	2	MsgId	MI	Message Id; 0x00	Enum: 0: LED Status monocolor		
8	8	Current Dim Level	DLVL	Current dim level for the monocolor LED	Enum: 0...200: 0...100 % 0xFF: If not used		

RORG	D2	VLD Telegram
FUNC	40	LED Controller Status
TYPE	01	Type 0x01

Submitter: EnOcean GmbH

MsgId 0x01: Status of RGB LED controller

MsgId 0x01

DB_3.BIT_7 ← 0	DB_3								DB_2								DB_1								DB_0							
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Bit Offset: 0 → 31	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	OUTEN	DRA	DHAR	OCC			SREAS	MI	DLVLR								DLVLG								DLVLB							
									red LED								green LED								blue LED							

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	LED output enabled	OUTEN	Driving LED enabled	Enum: 0: Disabled 1: Enabled		
1	1	"Demand Response" mode Active	DRA	Controller is in the DR mode. It had received a DR command from DR controller, and it is executing it.	Enum: 0: False 1: True		
2	1	Daylight Harvesting Active	DHAR	Daylight harvesting feature is turned on. Readings from photo sensor are influencing the dimming level.	Enum: 0: False 1: True		
3	2	Occupancy State	OCC	Room which controller is in charge of is considered occupied.	Enum: 0: Not occupied 1: Occupied 2: Unknown		
5	1	Status Tx reason	SREAS	Reason for sending this status message	Enum: 0: Other 1: Heartbeat		
6	2	MsgId	MI	Message Id; 0x01	Enum: 1: LED Status RGB		
8	8	Current Dim Level LED R	DLVLR	Current dim level for the red LED	Enum: 0...200:	0...100	%
					0xFF: If not used		
16	8	Current Dim Level LED G	DLVLG	Current dim level for the green LED	Enum: 0...200:	0...100	%
					0xFF: If not used		
24	8	Current Dim Level LED B	DLVLB	Current dim level for the blue LED	Enum: 0...200:	0...100	%
					0xFF: If not used		

D2-50: Heat Recovery Ventilation

Submitter: Glen Dimplex

Description
The EEP family D2-50-XX provides different telegram types for heat-recovery ventilation control and status messages using various parameters and variables.

There are 4 types of messages:
- Ventilation Remote Transmission Request Message
- Ventilation Control Message
- Ventilation Basic Status Message

- Ventilation Extended Status Information Message

Data exchange
Direction: bidirectional
Addressing: unicast (ADT) + broadcast
Communication trigger: event- & time-triggered
Communication interval: min. 1s (not more than once per second on events), max. 5s (heartbeat)

Trigger event:
heartbeat 5s
on reception of 'Ventilation Control Message'
query / polling by 'Ventilation Remote Transmission Request Message'
on value change at ...
- "Operating Mode Status"
- "Digital Input 0...15 Status"
- "Digital Output 0...15 Status"
- "Info Message 0...15 Status"
- "Fault 0...31 Status"

Tx delay: -
Rx timeout: -

Teach-in
Teach-in method: Universal teach-in (UTE)

Security
Encryption supported: no
Security level format: -

EEP Family Table

TYPE 00: single room ventilation unit
TYPE 01: single room ventilation unit with pre-heater
TYPE 02...09: reserved for future single room variants
TYPE 10: multi room ventilation unit without bypass
TYPE 11: multi room ventilation unit with bypass
TYPE 12...xx: reserved for future multi room variants

Supported function	Type 00	Type 01	Type 10	Type 11
Message Type	X	X	X	X
Requested Message Type	X	X	X	X
Direct Operation Mode Control	X	X	X	X
Operation Mode Control	X	X	X	X
Timer Operation Mode Control	X	X	X	X
CO2 Threshold	X	X	X	X
Heat Exchanger Bypass Control	-	-	-	X
Humidity Threshold	X	X	X	X
Air Quality Threshold	X	X	X	X
Room Temperature Threshold	-	-	X	X
Operation Mode Status	X	X	X	X
Safety Mode Status	-	-	-	X
Heat Exchanger Bypass Status	-	-	-	X
Supply Air Flap Position	X	X	-	-
Exhaust Air Flap Position	X	X	-	-
Defrost Mode Status	X	X	X	X
Cooling Protection Status	X	X	X	X
Outdoor Air Heater Status	-	X	X	X
Supply Air Heater Status	-	-	X	X
Drain Heater Status	X	X	-	-
Timer Operation Mode Status	X	X	X	X
Filter Maintenance Status	X	X	X	X
Weekly Timer Program Status	-	-	X	X
Room Temperature Control Status	-	-	X	X
Air Quality Sensor 1	X	X	X	X
Master/Slave Status	X	X	-	-
Air Quality Sensor 2	-	-	X	X
Outdoor Air Temperature	X	X	X	X
Supply Air Temperature	X	X	X	X

Indoor Air Temperature	-	-	X	X
Exhaust Air Temperature	-	-	X	X
Supply Air Fan Air Flow Rate	X	X	X	X
Exhaust Air Fan Air Flow Rate	X	X	X	X
Supply Fan Speed	X	X	X	X
Exhaust Fan Speed	X	X	X	X
Software Version Info	X	X	X	X
Operation Hours Counter	X	X	X	X
Digital Input 0...15 Status	-	-	X	X
Digital Output 0...15 Status	-	-	X	X
Info Message 0...15 Status	X	X	X	X
Fault 0...31 Status	X	X	X	X

The list of parameters could be structured following the features that always include a certain group of parameters.

Each TYPE has to support every parameter that is marked in its column!

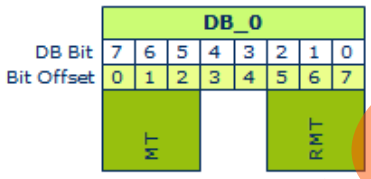
RORG	D2	VLD Telegram
FUNC	50	Heat Recovery Ventilation
TYPE	00	Type 0x00

Submitter: Glen Dimplex

Telegram Definition: 'Ventilation Remote Transmission Request Message'

The 'Ventilation Remote Transmission Request Message' queries a particular status message from the heat-recovery ventilation unit. Thus status messages can be obtained at any time or at a higher update rate than the heartbeat rate, e.g. during commissioning.

Direction: Gateway --> Heat-recovery ventilation unit



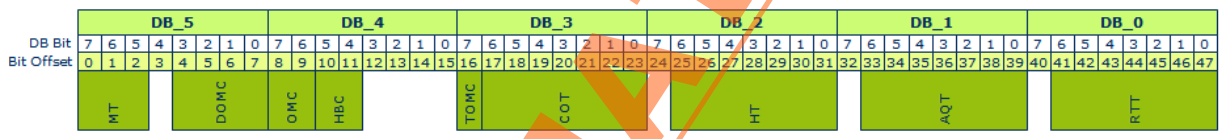
Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message Type	MT	Defines the message type	Enum: 0: Ventilation remote transmission request 1: Ventilation control 2: Ventilation basic status 3: Ventilation extended status 4: Reserved 5: Reserved 6: Reserved 7: Reserved		
3	2	Not Used (= 0)					

5	3	Requested Message Type	RMT	Defines the message type, which is requested by the remote device	Enum: 0: Ventilation basic status 1: Ventilation extended status 2: Reserved 3: Reserved 4: Reserved 5: Reserved 6: Reserved 7: Reserved

Telegram Definition: 'Ventilation Control Message'

The 'Ventilation Control Message' changes the operating mode, the state of several actuators and a subset of control parameters.

Direction: Gateway --> Heat-recovery ventilation unit



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message Type	MT	Defines the message type	Enum: 0: Ventilation remote transmission request 1: Ventilation control 2: Ventilation basic status 3: Ventilation extended status 4: Reserved 5: Reserved 6: Reserved 7: Reserved		
3	1	Not Used (= 0)					
4	4	Direct Operation Mode Control	DOMC	Selects ventilation mode/level	Enum: 0: Off 1: Level 1 2: Level 2 3: Level 3		

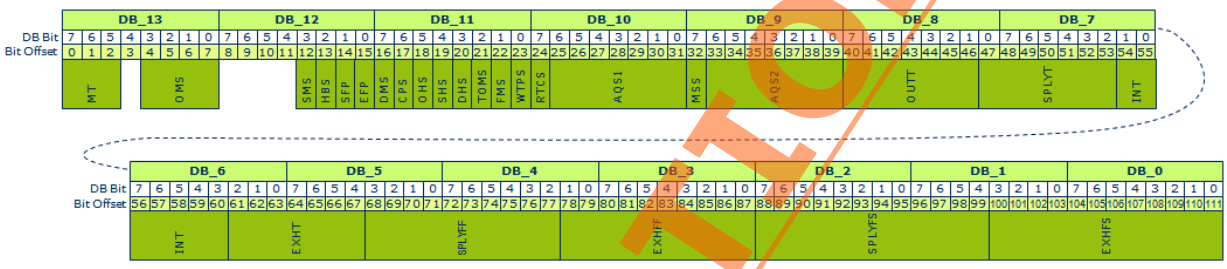
					4: Level 4 5: Reserved 6: Reserved 7: Reserved 8: Reserved 9: Reserved 10: Reserved 11: Automatic 12: Automatic on demand 13: Supply air only 14: Exhaust air only 15: No action (keep current ventilation mode/level)
8	2	Operation Mode Control	OMC	Selects the next resp. previous available ventilation mode/level	Enum: 0: No action 1: Select next operation mode (edge-trigger) 2: Select previous operation mode (edge-trigger) 3: Reserved
10	2	Heat Exchanger Bypass Control	HBC	Manual override of automatic heat exchanger bypass control	Enum: 0: No action 1: Close bypass (edge-trigger) 2: Open bypass (edge-trigger) 3: Reserved
12	4	Not Used (= 0)			
16	1	Timer Operation Mode Control	TOMC	Enables Timer Operation Mode, i.e. a particular ventilation mode is activated for a defined time	Enum: 0: No action 1: Start timer operation mode (edge-trigger)
17	7	CO2 Threshold	COT	Overrides CO2 threshold for CO2 control in automatic mode	Enum: 0...100: 0...100 % 101...126: Reserved 127: Default (use threshold configured in device)
24	1	Not Used (= 0)			
25	7	Humidity Threshold	HT	Overrides humidity threshold for humidity control in automatic mode	Enum: 0...100: 0...100 % 101...126: Reserved 127: Default (use threshold configured in device)
32	1	Not Used (= 0)			
33	7	Air Quality Threshold	AQT	Overrides air quality threshold for air quality control in automatic mode	Enum: 0...100: 0...100 % 101...126: Reserved 127: Default (use threshold configured in device)

40	1	Not Used (= 0)			
41	7	Room temperature threshold	RTT	Overrides room temperature threshold for room temperature control mode	Enum: 1...127: -63...+63 °C 0: Default - use threshold configured in device

Telegram Definition: 'Ventilation Basic Status Message'

The 'Ventilation Basic Status Message' provides current sensor values and internal control status information. It is triggered once at power-on and on particular value changes.
Additionally this message is available on request.

Direction: Heat-recovery ventilation unit --> Gateway



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message Type	MT	Defines the message type	Enum: 0: Ventilation remote transmission request 1: Ventilation control 2: Ventilation basic status 3: Ventilation extended status 4: Reserved 5: Reserved 6: Reserved 7: Reserved		
3	1	Not Used (= 0)					
4	4	Operation Mode Status	OMS	Shows current Operation Mode Status	Enum: 0: Off 1: Level 1 2: Level 2 3: Level 3 4: Level 4 5: Reserved 6: Reserved 7: Reserved 8: Reserved 9: Reserved 10: Reserved 11: Automatic		

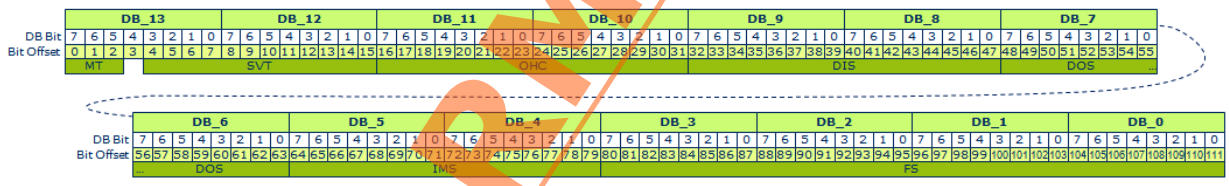
					12: Automatic on demand 13: Supply air only 14: Exhaust air only 15: Reserved
8	4	Not Used (= 0)			
12	1	Safety Mode Status	SMS	Indicates if device is running in fireplace safety mode	Enum: 0: Fireplace safety mode disabled 1: Fireplace safety mode enabled
13	1	Heat Exchanger Bypass Status	HBS	Indicates heat exchanger bypass status	Enum: 0: Bypass closed (heat-recovery active) 1: Bypass opened (heat-recovery inactive)
14	1	Supply Air Flap Position	SFP	Supply Air Flap Position	Enum: 0: Supply air flap closed 1: Supply air flap opened
15	1	Exhaust Air Flap Position	EFP	Exhaust Air Flap Position	Enum: 0: Exhaust air flap closed 1: Exhaust air flap opened
16	1	Defrost Mode Status	DMS	Indicates if device is running in defrost mode, i.e. automatic defrosting of heat exchanger is active	Enum: 0: Defrost mode inactive 1: Defrost mode active
17	1	Cooling Protection Status	CPS	Indicates if device is running in cooling protection	Enum: 0: Cooling protection mode inactive 1: Cooling protection mode active
18	1	Outdoor Air Heater Status	OHS	Outdoor Air Heater Status	Enum: 0: Inactive 1: Active
19	1	Supply Air Heater Status	SHS	Supply Air Heater Status	Enum: 0: Inactive 1: Active
20	1	Drain Heater Status	DHS	Drain Heater Status	Enum: 0: Inactive 1: Active
21	1	Timer Operation Mode Status	TOMS	Indicates timer operation mode status	Enum: 0: timer operation mode inactive 1: timer operation mode active
22	1	Filter Maintenance Status	FMS	Filter Maintenance Status	Enum: 0: Maintenance not required 1: Maintenance required
23	1	Weekly Timer Program Status	WTPS	Indicates if weekly timer program is active (i.e. if device is running according to configured program)	Enum: 0: Weekly timer program disabled or not configured 1: Weekly timer program active
24	1	Room Temperature Control Status	RTCS	Indicates room temperature control status	Enum: 0: Room temperature control inactive 1: Room temperature control active
25	7	Air Quality Sensor 1	AQS1	Current air quality sensor 1 measurement value	Enum: 0...100: 0...100 % 101...126: Reserved 127: Not available

32	1	Master/Slave Configuration Status	MSS	Indicates whether device is configured as master or slave unit	Enum: 0: Master 1: Slave		
33	7	Air Quality Sensor 2	AQS2	Current air quality sensor 2 measurement value	Enum: 0...100: 0...100 % 101...126: Reserved 127: Not available		
40	7	Outdoor Air Temperature	OUTT	Current outdoor air temperature	0...127	-64...+63	°C
47	7	Supply Air Temperature	SPLYT	Current supply air temperature	0...127	-64...+63	°C
54	7	Indoor Air Temperature	INT	Current indoor air temperature	0...127	-64...+63	°C
61	7	Exhaust Air Temperature	EXHT	Current exhaust air temperature	0...127	-64...+63	°C
68	10	Supply Air Fan Air Flow Rate	SPLYFF	Current supply air fan air flow rate setpoint	0...1023	0...1023	m3/h
78	10	Exhaust Air Fan Air Flow Rate	EXHFF	Current exhaust air fan air flow rate setpoint	0...1023	0...1023	m3/h
88	12	Supply Fan Speed	SPLYFS	Current supply air fan speed	0...4095	0...4095	1/min
100	12	Exhaust Fan Speed	EXHFS	Current exhaust air fan speed	0...4095	0...4095	1/min

Telegram Definition: 'Ventilation Extended Status Message'

The 'Ventilation Extended Status Message' provides additional information, e.g. active failure information. It is triggered once at power-on and on particular value changes.
Additionally, this message is available on request.

Direction: Heat-recovery ventilation unit --> Gateway



Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	3	Message Type	MT	Defines the message type	Enum: 0: Ventilation remote transmission request 1: Ventilation control 2: Ventilation basic status 3: Ventilation extended status 4: Reserved 5: Reserved 6: Reserved 7: Reserved		
3	1	Not Used (= 0)					
4	12	Software Version Info	SVI	Shows Software Version Information	0...4095	0...4095	-

16	16	Operation Hours Counter	OHC	Indicates device operation hours	0...65535	0...196605	h
32	16	Digital Input 0...15 Status	DIS	Indicates the current state of digital inputs 0...15 of the device input assignment depends on device variant and configuration	Enum: 0x0001: Input no. 00 active 0x0002: Input no. 01 active 0x0004: Input no. 02 active 0x0008: Input no. 03 active 0x0010: Input no. 04 active 0x0020: Input no. 05 active 0x0040: Input no. 06 active 0x0080: Input no. 07 active 0x0100: Input no. 08 active 0x0200: Input no. 09 active 0x0400: Input no. 10 active 0x0800: Input no. 11 active 0x1000: Input no. 12 active 0x2000: Input no. 13 active 0x4000: Input no. 14 active 0x8000: Input no. 15 active		
48	16	Digital Output 0...15 Status	DOS	Indicates the current state of digital outputs 0...15 of the device output assignment depends on device variant and configuration	Enum: 0x0001: Output no. 00 active 0x0002: Output no. 01 active 0x0004: Output no. 02 active 0x0008: Output no. 03 active 0x0010: Output no. 04 active 0x0020: Output no. 05 active 0x0040: Output no. 06 active 0x0080: Output no. 07 active 0x0100: Output no. 08 active 0x0200: Output no. 09 active 0x0400: Output no. 10 active 0x0800: Output no. 11 active 0x1000: Output no. 12 active 0x2000: Output no. 13 active 0x4000: Output no. 14 active 0x8000: Output no. 15 active		
64	16	Info Message 0...15 Status	IMS	Indicates the current state of info message no. 0...15 generated by the device	Enum: 0x0001: Info no. 00 active 0x0002: Info no. 01 active 0x0004: Info no. 02 active 0x0008: Info no. 03 active 0x0010: Info no. 04 active 0x0020: Info no. 05 active 0x0040: Info no. 06 active 0x0080: Info no. 07 active 0x0100: Info no. 08 active 0x0200: Info no. 09 active 0x0400: Info no. 10 active 0x0800: Info no. 11 active 0x1000: Info no. 12 active 0x2000: Info no. 13 active 0x4000: Info no. 14 active 0x8000: Info no. 15 active		
80	32	Fault 0...31 Status	FS	Indicates the current state of fault no. 0...31 generated by the device	Enum: 0x00000001: Fault no. 00 active 0x00000002: Fault no. 01 active 0x00000004: Fault no. 02 active 0x00000008: Fault no. 03 active		

					0x00000010:	Fault no. 04 active
					0x00000020:	Fault no. 05 active
					0x00000040:	Fault no. 06 active
					0x00000080:	Fault no. 07 active
					0x00000100:	Fault no. 08 active
					0x00000200:	Fault no. 09 active
					0x00000400:	Fault no. 10 active
					0x00000800:	Fault no. 11 active
					0x00001000:	Fault no. 12 active
					0x00002000:	Fault no. 13 active
					0x00004000:	Fault no. 14 active
					0x00008000:	Fault no. 15 active
					0x00010000:	Fault no. 16 active
					0x00020000:	Fault no. 17 active
					0x00040000:	Fault no. 18 active
					0x00080000:	Fault no. 19 active
					0x00100000:	Fault no. 20 active
					0x00200000:	Fault no. 21 active
					0x00400000:	Fault no. 22 active
					0x00800000:	Fault no. 23 active
					0x01000000:	Fault no. 24 active
					0x02000000:	Fault no. 25 active
					0x04000000:	Fault no. 26 active
					0x08000000:	Fault no. 27 active
					0x10000000:	Fault no. 28 active
					0x20000000:	Fault no. 29 active
					0x40000000:	Fault no. 30 active
					0x80000000:	Fault no. 31 active

RORG	D2	VLD Telegram
FUNC	50	Heat Recovery Ventilation
TYPE	01	Type 0x01 (description: see table)

See profile: D2-50-00

RORG	D2	VLD Telegram
FUNC	50	Heat Recovery Ventilation
TYPE	10	Type 0x10 (description: see table)

See profile: D2-50-00

RORG	D2	VLD Telegram
FUNC	50	Heat Recovery Ventilation
TYPE	11	Type 0x11 (description: see table)

See profile: D2-50-00

D2-A0: Standard Valve

RORG	D2	VLD Telegram
FUNC	A0	Standard Valve
TYPE	01	Valve Control (BI-DIR)

Submitter: Afriso / EnOcean

Description:
Radio operated valve control with feedback message. Valve is controlled through the air interface to be opened or closed. The valve reports the actual status after finishing the determined operation.

Data exchange
Direction: bidirectional
Addressing: addressed (inbound) and broadcast (outbound)
Communication trigger: event- & time-triggered
Trigger event: position of valve has changed
Teach-in method: UTE

DIRECTION-1 = Outbound (water valve to the controller)
Description: Valve reports its status. Report is sent after operation was executed or as a heartbeat.

DIRECTION-2 = Inbound (controller to the water valve)
Description: Operational command to the valve. After this request a feedback response will be transmitted, once the operation is finished.
A "no change"-command will also be followed by a feedback response. Therefore, it can be used as a status request.

DIRECTION-1

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	6	Not Used (= 0)					
6	2	Feedback	FDB	Return	Enum: 0b00: Not defined 0b01: Closed 0b10: Opened 0b11: Not defined		

DIRECTION-2

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	6	Not Used (= 0)					
6	2	Request	REQ	Request to operate the valve	Enum: 0b00: No change (request of feedback) 0b01: Request to close valve 0b10: Request to open valve 0b11: Request to close valve		

D2-B0: Liquid Leakage Sensor

RORG	D2	VLD Telegram
FUNC	B0	Liquid Leakage Sensor
TYPE	51	Mechanic Harvester

Submitter: Afriso / EnOcean

Description

This device is used to detect water. It is commonly placed on ground where a water leakage causes damage.
The principle is that "paper rings" swell in water and trigger an ECO 200 (generator) based transmitter.
This version is done for USA 902 MHz.

Data exchange
Direction: unidirectional
Addressing: broadcast
Communication trigger: event-triggered
Communication interval: N/A
Trigger event: (water detected)
Tx delay: -
Rx timeout: -

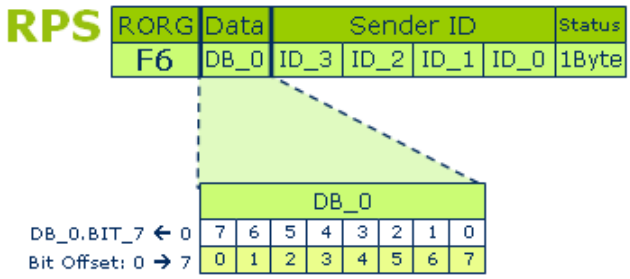
Teach-in
Teach-in method: UTE teach-in

Security
Encryption supported: no
Security level format: -

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	8	Water sensor	WA	Alert signal that the sensor detected water leakage.	Enum: 0x00: No water detected / return position 0x11: Water detected		

3) Appendix

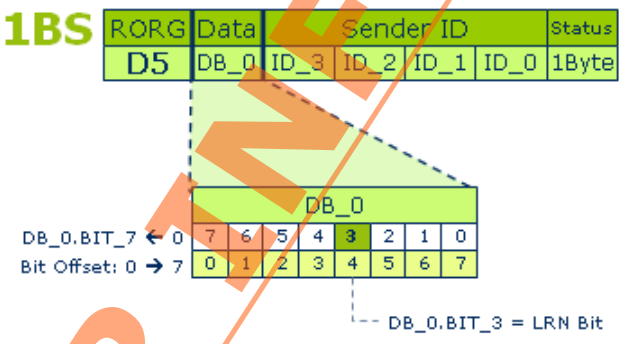
3.1) RPS Teach-in



The RPS telegram can only send data and has no special telegram modification to teach-in the device. Therefore, the teach-in procedure takes place manually on the actuator/controller through a normal data telegram. The EEP profile must be manually supplied to the controller per sender ID.

In learn mode, the receiving actuator reduces the input sensitivity in order to fade out weakly received data telegrams. This helps avoid inadvertently teaching-in sensors.

3.2) 1BS Teach-in



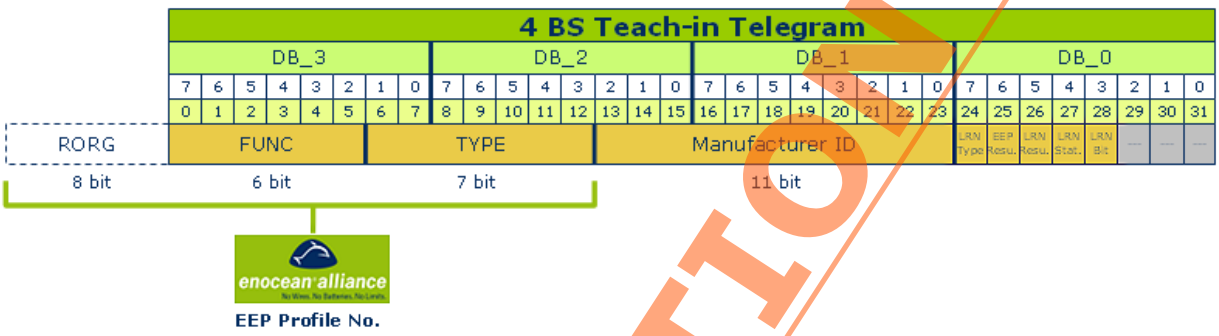
The 1BS telegram has its own teach-in telegram, which can signal the teach-in command through the DB_0.BIT_3 data bit.

Offset	Size	Bitrange	Data	Valid Range	Scale	Unit

4	1	DB0.3	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram

Here, an EEP profile must also be manually allocated per sender ID.

3.3) 4BS Teach-in



The 4BS telegram also has its own teach-in telegram, however with more teach-in variations:

Variation 1

The profile-less unidirectional teach-in procedure functions according to the same principle as the 1BS telegram: if the data bit is DB_0.BIT_3 = 0, then a teach-in telegram is sent. This includes the 'LRN TYPE' DB_0.BIT_7 = 0 data bit. Then no EEP profile identifier and no manufacturer ID are transferred.

Offset	Size	Bitrange	Data	Valid Range	Scale	Unit
24	1	DB0.7	LRN Type	Enum: 0: telegram without EEP and Manufacturer ID		
28	1	DB0.3	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		

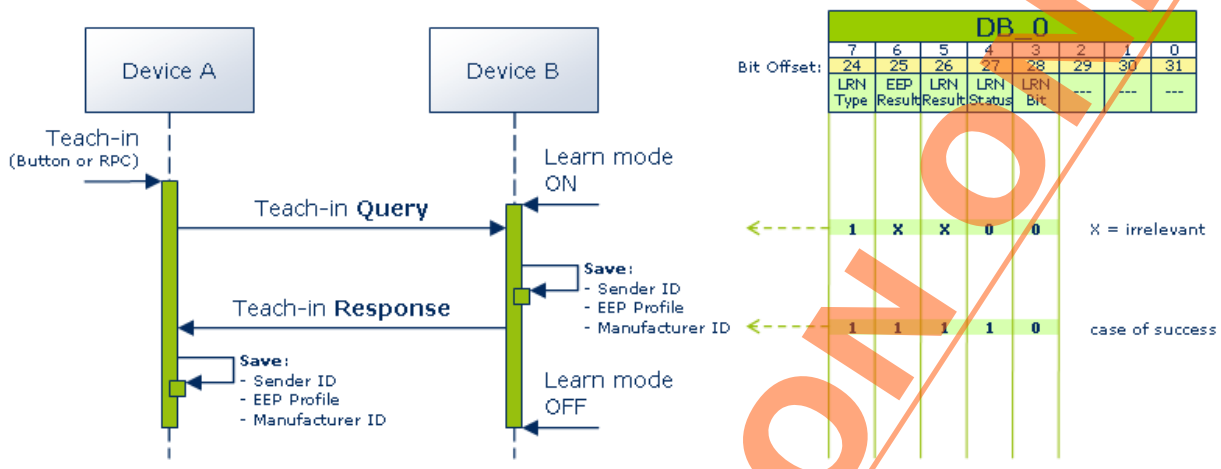
Variation 2

For the unidirectional profile teach-in procedure, it is preferred in opposite to variation 1), as the teach-in telegram contains both the complete EEP number and the manufacturer ID. The device is therefore clearly identifiable as ready-to-use and can be securely executed in a complex system environment or by foreign systems. In this case, the 'LRN TYPE' data bit is DB_0.BIT_7 = 1.

Offset	Size	Bitrange	Data	Valid Range	Scale	Unit
24	1	DB0.7	LRN Type	Enum: 1: telegram with EEP number and Manufacturer ID		
28	1	DB0.3	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		

Variation 3

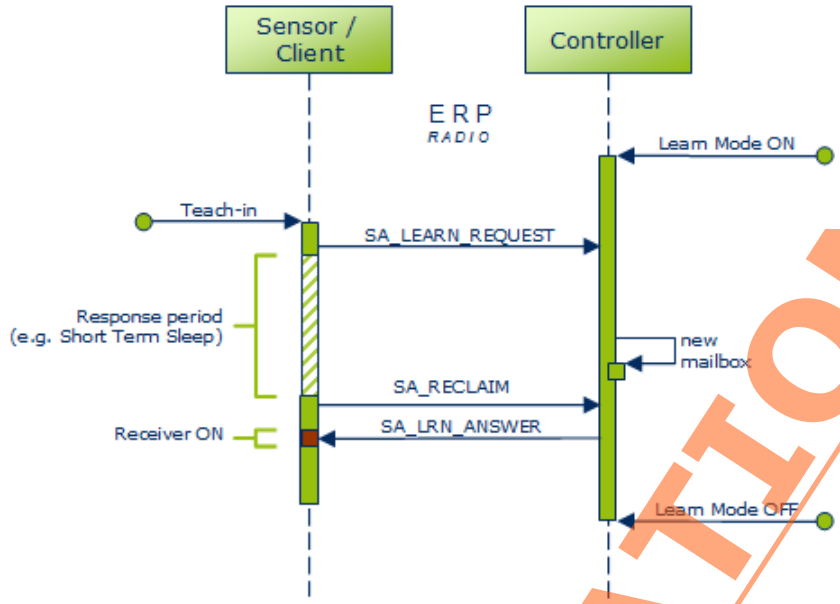
During the bidirectional teach-in procedure, further bits are required from the DB_0, in order to develop the mutual teach-in between two communication partners. For this, the procedure is made up of 2 teach-in telegrams, which are exchanged on both sides. The following UML diagram is used to illustrate this:



Offset	Size	Bitrange	Data	Valid Range	Scale	Unit
24	1	DB0.7	LRN Type	Enum: 0: telegram without EEP and Manufacturer ID 1: telegram with EEP number and Manufacturer ID		
25	1	DB0.6	EEP Result	Enum: 0: EEP not supported 1: EEP supported		
26	1	DB0.5	LRN Result	Enum: 0: Sender ID deleted/not stored 1: Sender ID stored		
27	1	DB0.4	LRN Status	Enum: 0: Query 1: Response		
28	1	DB0.3	LRN Bit	Enum: 0: Teach-in telegram 1: Data telegram		

3.4) Smart Ack Teach-in (without repeater)

Under Smart Ack (SA), the teach-in procedure is more complex as, alongside the SA client and SA controller, a Postmaster must also be established to prepare a mailbox for each taught-in SA client. The Postmaster is normally found in the controller. If a repeater is installed, then a postmaster is set up there.

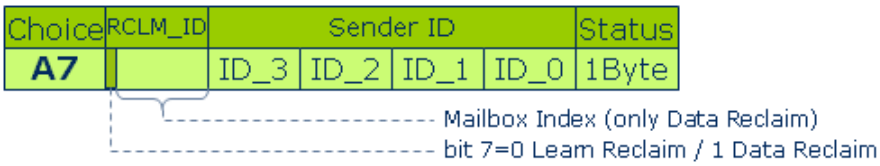


After the learn mode is activated on the controller, the teach-in procedure can be started on the client. The client sends an SA_LEARN_REQUEST telegram:

RORG	Req.	Manuf.ID	EEP (3 byte)			RSSI	Repeater ID				Sender ID				Status	CHCK
C6	5 bit	11 bit	RORG	FUNC	TYPE	dBm	ID_3	ID_2	ID_1	ID_0	ID_3	ID_2	ID_1	ID_0	1 Byte	1 Byte
	Request Code															

Data	Value	Description
Request Code	0b11111	Default value – send by sensor
Manufacturer ID	0bnnnnnnnnnn	Corresponding to the teach-in sensor
EEP No.	0xnnnnnn	RORG, FUNC, TYPE
RSSI	0x00	0 = Without repeater
Repeater ID	0x00000000	0 = Without repeater
Sender ID	0xnnnnnnnn	Chip ID of sensor for teach-in
Status	0x0F	0F = no repeating permitted
CHCK	0xnn	Checksum

During the 'response period' in the SA client, which is always 550 ms during the teach-in, the controller creates a new mailbox in its postmaster and leaves its first message there with an OK receipt. This entry is requested from the postmaster by the SA client with an SA_RECLAIM 'Learn' telegram:



Data	Value	Description
Message Index	0b0	Bit 7: 0 = Learn Reclaim
Sender ID	0xnnnnnnnn	Chip ID of sensor for teach-in
Status	0x0F	0F = no repeating desired
CHCK	0xnn	Checksum

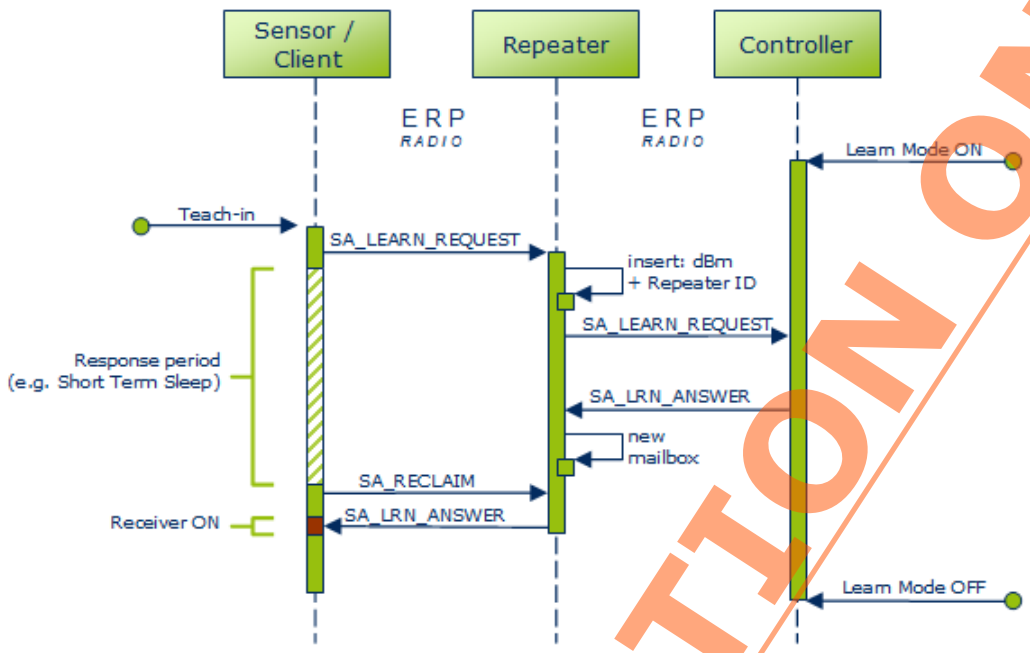
The final telegram sent to the SA client, SA_LRN_ANSWER, contains the 'Learn Acknowledge' message from the mailbox that the teach-in procedure has been carried out successfully:

Smart Ack Learn Answer (Learn Acknowledge)

RORG	RORG-EN	Index	Response time		Ack C.	Mailbox	not used			Postmaster ID				Controller ID				Status	CHCK
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A6	C7	02					-	-	-	ID_3	ID_2	ID_1	ID_0	ID_3	ID_2	ID_1	ID_0		

Data	Value	Description
RORG	0xA6	A6 = ADR Telegram
RORG-EN	0xC7	RORG encapsulated / C7 = SA_LRN_ANSWER
Index	0x02	Message Index; 02 = Learn Acknowledge
Response time	0xnnnn	Response time for Smart Ack Client in ms in which the controller can prepare the data and send it to the postmaster (max. value 550 ms = 0x0226)
Acknowledge code	0x00	First Learn In successful
Mailbox index	0xnn	Index no. of the assigned mailbox
Postmaster ID	0xnnnnnnnn	Device ID of the Post master candidate
Controller ID	0xnnnnnnnn	Device ID of the assigned controller
Status	0x0F	0F = no repeating permitted
CHCK	0xnn	Checksum

3.5) Smart Ack Teach-in (with repeater)



If a repeater comes into operation, the SA_LEARN_REQUEST telegram sent by the SA client (with an EEP No., Manufacturer ID, Sender ID) is completed on the repeater with the RSSI value (in dBm) and the Repeater ID, and sent to the controller.

RORG	Req.	Manuf.ID	EEP (3 byte)			RSSI	Repeater ID				Sender ID				Status	CHCK
C6	5 bit	11 bit	RORG	FUNC	TYPE	dBm	ID_3	ID_2	ID_1	ID_0	ID_3	ID_2	ID_1	ID_0	1 Byte	1 Byte
Request Code																

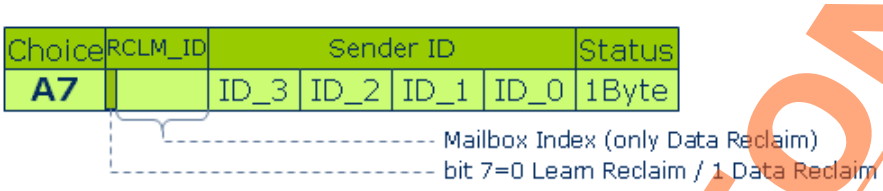
Data	Value	Description
Request Code	0b11111	Default value – send by sensor
Manufacturer ID	0bnnnnnnnnnn	Corresponding to the teach-in sensor
EEP No.	0xnnnnnn	RORG, FUNC, TYPE
RSSI	0xnn	Value added from repeater
Repeater ID	0xnnnnnnnn	Device ID repeater
Sender ID	0xnnnnnnnn	Chip ID of sensor for teach-in
Status	0x0F	0F = no repeating permitted
CHCK	0xnn	Checksum

From the reception strength of the RSSI, the controller can recognise which repeater is best for the task of postmaster. In the meantime, the SA client will be in its 'response period'.
The sent addressed telegram **SA_LRN_ANSWER** with the message 'Learn Reply' by the controller to the repeater ensures that the postmaster is activated and a mailbox is created.

RORG	Req.	Manuf.ID	EEP (3 byte)			RSSI	Repeater ID				Sender ID				Status	CHCK
C6	5 bit	11 bit	RORG	FUNC	TYPE	dBm	ID_3	ID_2	ID_1	ID_0	ID_3	ID_2	ID_1	ID_0	1 Byte	1 Byte
Request Code																

Data	Value	Description
RORG	0xA6	A6 = ADR Telegram
RORG-EN	0xC7	RORG encapsulated / C7 = SA_LRN_ANSWER
Index	0x01	Message Index; 01 = Learn Reply
Response time	0xnnnn	Response time for Smart Ack Client in ms in which the controller can prepare the data and send it to the postmaster (max. value 550 ms = 0x0226)
Acknowledge code	0x00	First Learn In successful
Sender ID	0xnnnnnnnn	Chip ID of sensor to be teach-in
Postmaster ID	0xnnnnnnnn	Device ID of the Post master candidate
Controller ID	0xnnnnnnnn	Device ID of the assigned controller
Status	0x0F	0F = no repeating permitted
CHCK	0xnn	Checksum

Also, a mailbox is created for the SA client, where an initial entry with an OK message is left. This information is requested by the SA client from the repeater's postmaster with the SA_RECLAIM 'Learn' telegram.



Data	Value	Description
Message Index	0b0	Bit 7: 0 = Learn Reclaim
Sender ID	0xnnnnnnnn	Chip ID of sensor for teach-in
Status	0x0F	0F = no repeating desired
CHCK	0xnn	Checksum

The final telegram sent to the SA client, SA_LRN_ANSWER, contains the 'Learn Acknowledge' message from the mailbox that the teach-in procedure has been carried out successfully:

Smart Ack Learn Answer (Learn Acknowledge)

RORG	RORG-EN	Index	Response time		Ack C.	Mailbox	not used			Postmaster ID				Controller ID				Status	CHCK
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A6	C7	02					-	-	-	ID_3	ID_2	ID_1	ID_0	ID_3	ID_2	ID_1	ID_0		

Data	Value	Description
RORG	0xA6	A6 = ADR Telegram
RORG-EN	0xC7	RORG encapsulated / C7 = SA_LRN_ANSWER
Index	0x02	Message Index; 02 = Learn Acknowledge
Response time	0xnnnn	Response time for Smart Ack Client in ms in which the controller can prepare the data and send it to the postmaster (max. value 550 ms = 0x0226)
Acknowledge code	0x00	First Learn In successful
Mailbox index	0xnn	Index no. of the assigned mailbox
Postmaster ID	0xnnnnnnnn	Device ID of the Post master candidate
Controller ID	0xnnnnnnnn	Device ID of the assigned controller
Status	0x0F	0F = no repeating permitted
CHCK	0xnn	Checksum

3.6) UTE – Universal Uni- and Bidirectional Teach-in

General

Up to now there are teach-in procedures available for:

- RPS communication (EnOcean ID + rocker/channel information, unidirectional)
- 1BS communication (LRN telegram, w/o EEP and MID, unidirectional)
- 4BS communication (LRN telegram, w FUNC+TYPE and MID, unidirectional)
- 4BS communication (LRN telegram, w FUNC+TYPE and MID, bidirectional)
- SmartACK communication (self powered devices, bidirectional)

For uni- and bidirectional EEP communication that does not fit into SmartACK communication principles but is based on e.g. MSC and VLD messages no teach-in procedure is defined so far.

Therefore, this document proposes a universal teach-in procedure that allows handling of teach-in and teach-out requirements for EEP based communication of all different RORG. This proposal shall be understood as an alternative to SmartACK teach-in for devices where SmartACK is not applicable.

RORG to be used: **0xD4** Universal Teach-in, EEP based (UTE)

FUNC and TYPE shall be represented as 8bit parameters, both with a value range from 0x00 … 0xFF. This aligns UTE with the EEP representation defined for SmartACK teach-in.

REMARK 1:
Even though the proposed Universal Tech-In Procedure is able to cover EEPs based on RPS, 1BS and 4BS messages as well, it is not intended to replace the existing RPS, 1BS and 4BS teach-in / teach-out procedures for unidirectional and the existing 4BS teach-in / teach-out procedures for bidirectional communication.
However, it is recommended that with the acceptance of the proposed Universal Tech-In Procedure all new bidirectional 4BS applications shall use it for teach-in and teach-out as well.

REMARK 2:
The proposed Universal Tech-In Procedure is dedicated to EEP based EnOcean communication. It does neither compete with nor shall it interfere with the tech-in process of the Generic EnOcean Communication.

Communication – Principles and Definitions

BIDIRECTIONAL EEP-BASED COMMUNICATION

Bidirectional EnOcean communication means a point-to-point communication relationship between two enabled EnOcean devices. It requires all parties involved to know the unique EnOcean ID of their partners.
Such point-to-point communication relationship is established with the completion of a successful teach-in process and it is deleted with the completion of a successful teach-out process.

To get a maximum reliable teach-in process with a minimum consumption of energy and resources, a simple query - response mechanism is used: the device that is intended to be taught-in broadcasts a query message and gets back an addresses response message, containing its own EnOcean ID as the transmission target address.

In case there is more than one device ready to accept teach-in query messages at the same time and within the same radio range, the device with the quickest response time will be accepted by the device to be taught-in. Second and further devices will respond as well but they will not be accepted by the device to be taught-in. This will result in a configuration situation that is common to today's EEP based unidirectional teach-in processes.

UNIDIRECTIONAL EEP-BASED COMMUNICATION

Unidirectional EnOcean communication means a point-to-multipoint communication relationship between enabled EnOcean devices. In this case of broadcasting the device to be taught-in to other devices does not know the unique EnOcean ID of those communication partners.

The proposed Universal Teach-In Procedure supports unidirectional EnOcean communication thru related configuration bits in the query message.

However, for specific applications – e.g. configuration feedback - it is also possible to combine a bidirectional teach-in process with a unidirectional EEP based communication during the regular operation of a device.

EEP Teach-In Query - UTE Message (Broadcast / CMD: 0x0)

This message is sent by the EEP based EnOcean device that is intended to be taught-in to another device (which has been set into LRN-mode before either manually or thru a ReMan command).

Response Timing:
If a response is expected it shall be received within a maximum of 700ms from the time of transmission of this message. In case no such response is received within this time frame the query action shall be treated as completed with negative result. If no response is expected, each query action has to be treated as completed with positive result.

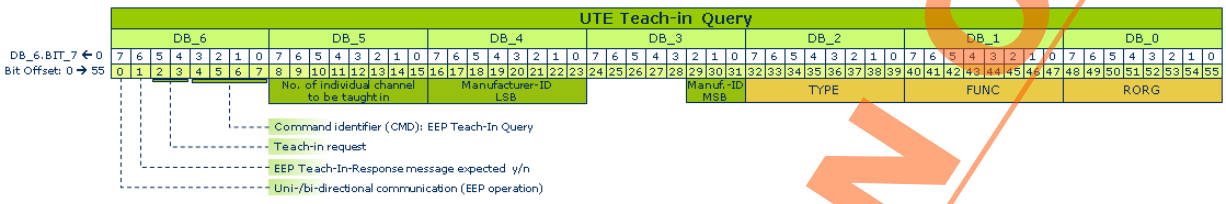


TABLE OF 7 BYTE PAYLOAD:

Offset	Size	Bitrange	Value	Description
0	1	DB6.7	0b0	Unidirectional communication (EEP operation)
" "	" "	" "	0b1	Bidirectional communication (EEP operation)
1	1	DB6.6	0b0	EEP Teach-In-Response message expected
" "	" "	" "	0b1	No EEP Teach-In-Response message expected
2	2	DB6.5 ... DB6.4	0b00	Teach-in request
" "	" "	" "	0b01	Teach-in deletion request
" "	" "	" "	0b10	Teach-in or deletion of teach-in, not specified
" "	" "	" "	0b11	Not used
4	4	DB6.3 ... DB6.0	0x0	Command identifier (CMD) / 0x0: EEP Teach-In Query
8	8	DB5.7 ... DB5.0	0x00 ... 0xFE	Number of individual channel to be taught in
" "	" "	" "	0xFF	Teach-in of all channels supported by the device
16	8	DB4.7 ... DB4.0	MID (8LSB)	Manufacturer-ID (8LSB)
24	5	DB3.7 ... DB3.3	-	Do not use
29	3	DB3.2 ... DB3.0	MID (3MSB)	Manufacturer-ID (3MSB)
32	8	DB2.7 ... DB2.0	TYPE	TYPE of EEP [0x00 ... 0xFF]
40	8	DB1.7 ... DB1.0	FUNC	FUNC of EEP [0x00 ... 0xFF]
48	8	DB0.7 ... DB0.0	RORG	RORG of EEP [0x00 ... 0xFF]

EEP Teach-In Response - UTE Message (Addressed / CMD: 0x1)

This message is the reply to an EEP Teach-In Query message. It is sent by the EEP based EnOcean device that has been set into LRN-mode before (either manually by HMI or thru a ReMan command).

Response Timing:
If a response is requested this message shall be sent within a maximum of 500ms from the time of reception of the EEP Teach-In Query message. This limit shall give sufficient time to decide on the teach-in request and answer accordingly (e.g. when requests need to be processes by data base systems connected asynchronously).

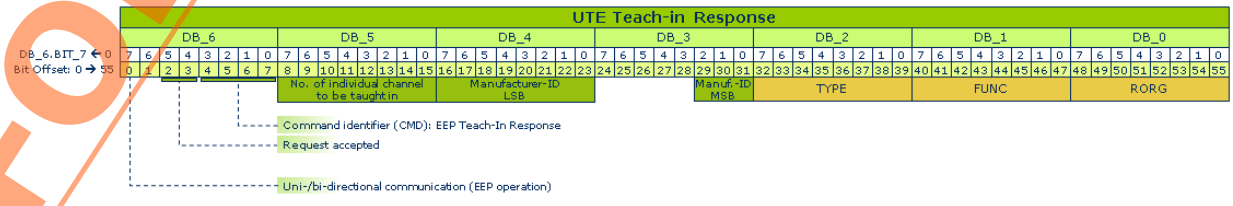
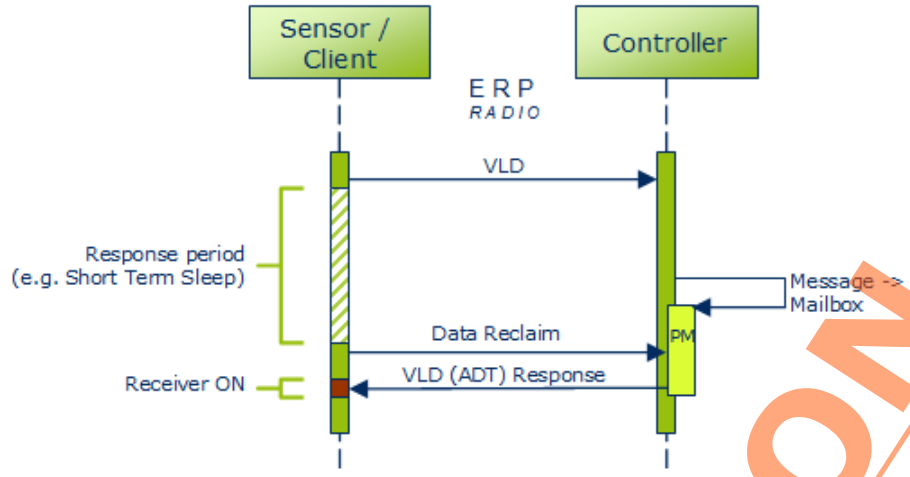


TABLE OF 7 BYTE PAYLOAD:

Offset	Size	Bitrange	Value	Description
0	1	DB6.7	0b0	Unidirectional communication (EEP operation)
" "	" "	" "	0b1	Bidirectional communication (EEP operation)
1	1	DB6.6	-	Not used
2	2	DB6.5 ... DB6.4	0b00	Request not accepted, general reason
" "	" "	" "	0b01	Request accepted, teach-in successful
" "	" "	" "	0b10	Request accepted, deletion of teach-in successful
" "	" "	" "	0b11	Request not accepted, EEP not supported
4	4	DB6.3 ... DB6.0	0x1	Command identifier (CMD) / 0x1: EEP Teach-In Response
8	48	DB5.7 ... DB0.0	...	Same structure as Teach-In Query message (EEP, MID and channel of requesting device is echoed back)

3.7) Smart Ack: functional principle (without repeater)



Smart Ack is a bidirectional communication protocol between a self-powered device and a line-powered controller. Data transmission in both directions is controlled by the sensor/client, as the limited energy budget requires an exact synchronization of the sent and the received messages. This pre-defined time interval allows a very short activation of the energy-intensive receiver electronics on the client.

If the teach-in procedure has already taken place as in Chapter 'Smart Ack Teach-in procedure' and the two devices already ‘know each other’, communication always takes place as following under Smart Ack:

The client sends its message over a VLD telegram to the controller (Manufacturer ID = optional).

VLD

RORG	Manufacturer ID	Variable data	Sender ID				Status	CRC8
D2	1,5 byte	1 ... 12,5 bytes	ID_3	ID_2	ID_1	ID_0	1 byte	1 byte

Finally, the message is processed in the controller, or forwarded to an external micro-controller over the serial interface for each use case. During the intervening period, the client is in the 'response period', which is frequently connected to an energy saving measure (like ‘Short Term Sleep’). The length of this time period is agreed during the teach-in procedure between the devices as ‘response time’. The feedback defined for the client is deposited in the mailbox of the postmaster (PM). When the client is active again, it requests this message containing the Smart Ack telegram DATA_RECLAIM from the responsible postmaster.

RORG		Sender ID				Status	CHCK
A7		ID_3	ID_2	ID_1	ID_0	1Byte	1 Byte

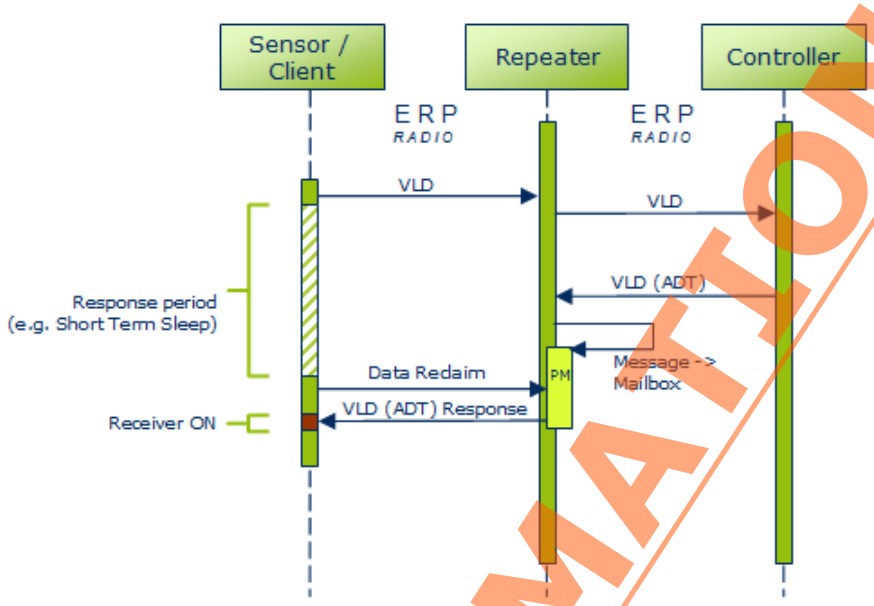
bit 0 ... 6: Mailbox Index
bit 7: 1 = Message index 'Data Reclaim'

Finally, the receiver part of the client is activated and the message sent by the postmaster is accepted. In this case the VLD telegram is sent encapsulated as ADT telegram (= addressed).

ADT / VLD

RORG	RORG-EN	Manufacturer ID	Variable data	Destination ID				Sender ID				Status	CRC8
A6	D2	1,5 byte	1 ... 7,5 bytes	ID_3	ID_2	ID_1	ID_0	ID_3	ID_2	ID_1	ID_0	1 byte	1 byte

3.8) Smart Ack: functional principle (with repeater)



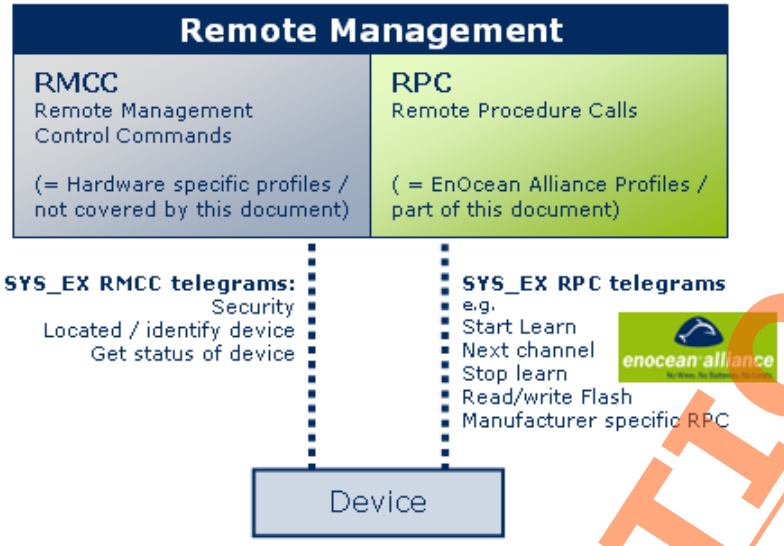
If a repeater is used, it takes over the task of the postmaster after the teach-in procedure. Hence, the client cannot view under operating conditions whether it is communicating directly with a controller or with a repeater.

The VLD telegram of the client is forwarded by the repeater 1:1 in the direction of the controller. The feedback is transferred in the form of an addressed telegram (containing Repeater ID) to the postmaster of the repeater and stored in the mailbox.

The client then turns to the repeater with its 'Data Reclaim', instead of turning to the controller, and requests the response message from the postmaster.

3.9) Remote Management / RPC

Remote Management allows EnOcean devices to be configured and maintained over the air or via a serial interface. For instance sensor or switch IDs can be stored or deleted from already installed actuators or gateways that are hard to access. There is a remote management library available for Dolphin based products.



Remote management is divided into two function groups:

RMCCs are mandatory features; they are permanently defined and they have overlapping tasks. They cannot be modified devicespecifically and are therefore, not an integral part of this description.

RPCs cover optional and manufacturer-specific features, and they have a flexible number of functionalities that can be used for numerous devices. If new device properties are mapped, RPCs can be extended correspondingly. To keep the RPCs interoperable, it is in the interest of the EnOcean Alliance to standardize these procedures.

The RPCs available today with their SYS_EX structures do not have any data-technical commonalities with EEP, but are to be handled the same way in future within the framework of coordination measures.

Structure of SYS_EX for RPC

SYS_EX telegrams for RPCs are generally encapsulated in an ADT telegram (RORG = A6) and are sent addressed as such.

ADT / SYS_EX / RPC

RORG	RORG-EN	SYS-EX data	Destination ID				Sender ID				Status	CRC8
A6	C5	x bytes	ID_3	ID_2	ID_1	ID_0	ID_3	ID_2	ID_1	ID_0	1 byte	1 byte

In the following section the SYS_EX data is described in detail. Note that Remote Management RPC commands are composed of several telegrams. That means SYS_EX data is than merged in one data block. The next section describes this datablock in detail.

For further details refer to the specification Remote Management, V1.7, Dec 16, 2010, released by EnOcean GmbH www.enocean.com/fileadmin/redaktion/pdf/tec_docs/RemoteManagement.pdf , please.

Title	RPC - Remote learn
Function code	0x201

Manufacturerid	0x7FF
Datalength	0x04
Broadcast	YES
Addressable	YES
Answer	NO

Offset	Size	Data	Description	Valid Range	Scale	Unit
0	24	EEP (ORG-FUNC-TYPE)	Determines the device type to learn in, all other devices learn telegrams are ignored. To ignore EEP controll the mask bits has to be set to 0)	...	...	
24	8	Flag	learn flag, determines different behaviour of the learn procedure	Enum: 0x00: RESERVED 0x01: Start learn 0x02: Next channel 0x03: Stop learn 0x04: SmartACK - Start simple learn mode 0x05: SmartACK - Start advanced learn mode 0x06: SmartACK - Stop learn		

Title	RPC - Remote flash write
Function code	0x203
Manufacturerid	0x7FF
Datalength	0x04 + N
Broadcast	YES
Addressable	YES
Answer	NO

Using this command the flash of a device can be written.

Offset	Size	Data	Description
0	16	Flash Memory Address	Destination where the data should be stored
16	16	Number of Bytes	Number of bytes to be transfered and written to the flash
32	N*8	Data	data to be transfered and written to the flash

Title	RPC - Remote flash read
Function code	0x204
Manufacturerid	0x7FF
Datalength	0x04
Broadcast	NO
Addressable	YES
Answer	YES

Using this command the flash can be read from the application. The data requested data area transmitted in RPC telegrams.

Offset	Size	Data	Description
16	16	Number of Bytes	Number of bytes to be transfered and written to the flash

Title	RPC - Remote flash read answer
Function code	0x804
Manufacturerid	0x7FF
Datalength	N
Broadcast	NO
Addressable	YES
Answer	NO

Offset	Size	Data	Description
0	N*8	Data	data read from flash

Title	RPC - SmartACK read settings
Function code	0x205
Manufacturerid	0x7FF
Datalength	1
Broadcast	NO
Addressable	YES
Answer	YES

Using this command the SmartACK settings and learn tables can be read from the device. The Setting type filled determines what type of data is requested. The data requested data area transmitted in RPC telegrams.

Offset	Size	Data	Description	Valid Range	Scale	Unit
0	8	>Setting type	type of settings to read	Enum:		
				0x00: RESERVED		
				0x01: Mailbox settings		
				0x02: Learned sensor - read the ID table of sensors in the Controller		

Title	RPC - SmartACK read settings - Mailbox settings answer
Function code	0x805
Manufacturerid	0x7FF
Datalength	4
Broadcast	NO
Addressable	YES
Answer	NO

Offset	Size	Data	Description
0	16	SmartACK flash address	Address where the SmartACK settings are stored
16	16	SmartACK mailbox count	number of mailboxes stored in flash

Title	RPC - SmartACK read settings - Learned sensor answer
Function code	0x806
Manufacturerid	0x7FF
Datalength	N*9
Broadcast	NO
Addressable	YES
Answer	NO

N - is the number of entries: SensorID, ControllerID, LearnCount

Offset	Size	Data
N*0	32	SensorID
N*32	32	ControllerID
N*64	8	Learned Count

Title	RPC - SmartACK write settings
Function code	0x206
Manufacturerid	0x7FF
Datalength	10
Broadcast	NO
Addressable	YES
Answer	YES

Using this command different type of data can be transmitted to the SmartACK devices. This command is useful when the SmartACK device has to be configured remotely. The structure of the data transmitted is depends on the Operation Type field.

Operation Type = 0x01: Add mailbox (only controller)

Offset	Size	Data	Value	Description
0	8	Operatian Type	0x01	Add mailbox (only controller)
8	8	Mailbox Index		
16	32	SensorID		
48	32	PostmasterID		

Operation Type = 0x02: Delete mailbox

Offset	Size	Data	Value	Description
0	8	Operation Type	0x02	Delete mailbox
8	8	Mailbox Index		
16	64	Not Used (= 0)		

Operation Type = 0x03: LearnIn - only controller

Offset	Size	Data	Value	Description
0	8	Operation Type	0x03	LearnIn - only controller
8	8	Learn Count		
16	32	SensorID		
48	32	ControllerID		

Operation Type = 0x04: LearnOut - only controller

Offset	Size	Data	Value	Description
0	8	Operation Type	0x04	LearnOut - only controller
8	8	Learn Count		
16	32	SensorID		
48	32	ControllerID		

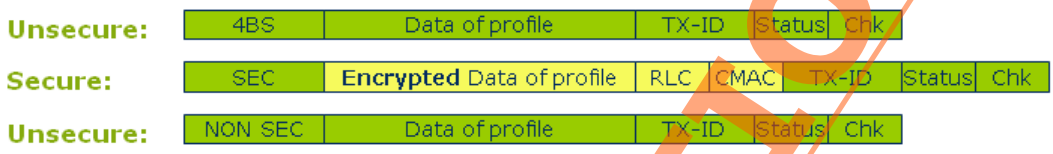
3.10) Interoperability with Security of EnOcean Networks

The Specification "Security of EnOcean Networks" defines two new telegram types for secure EnOcean telegrams in operational mode:

- R-ORG = 0x30 = SEC *Secure telegram*
- R-ORG = 0x31 = SEC_ENCAPS *Secure telegram with R-ORG encapsulation*

To make sure that interoperability is warranted, both telegrams may used for telegram transmission with existing EEP's. Because the profile of the device is known, the data of the SEC or SEC_ENCAPS telegram contains the same information as described in the profile, but it may be encrypted defined by the SLF (Security level format) of the device. When the device uses more than one R-ORG's in operational mode, the SEC_ENCAPS telegram has to be applied to ensure the correct original R-ORG after converting from secure to unsecure telegram. At present, 3 different communication variants having the existing XML structure can be mapped, which approximate the principles of a bi-directional data transfer. The teach-in procedure required for this is described in the same chapter.

Example for converting a telegram from unsecure to secure and back:



The data of the known profile will be applied in the unsecure telegram after the conversion from secure to unsecure telegram.

Example for converting a telegram from unsecure to secure and back with encapsulated R-ORG:

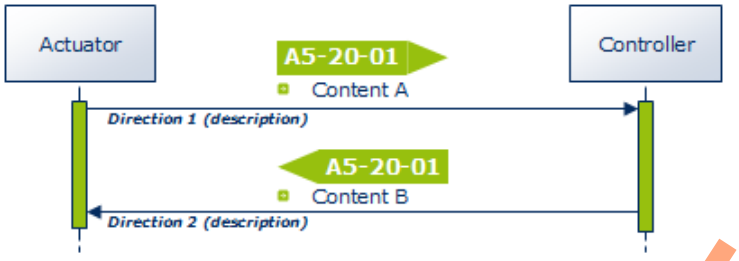
After conversion from secure to unsecure telegram, the encapsulated R-ORG will be applied in the telegram. The data of the profile of the encapsulated R-ORG will be applied.

3.11) Existing 'bidirectional' profile structures

At present, 3 different communication variants having the existing XML structure can be mapped, which approximate the principles of a bi-directional data transfer. The teach-in procedure required for this is described in the same chapter.

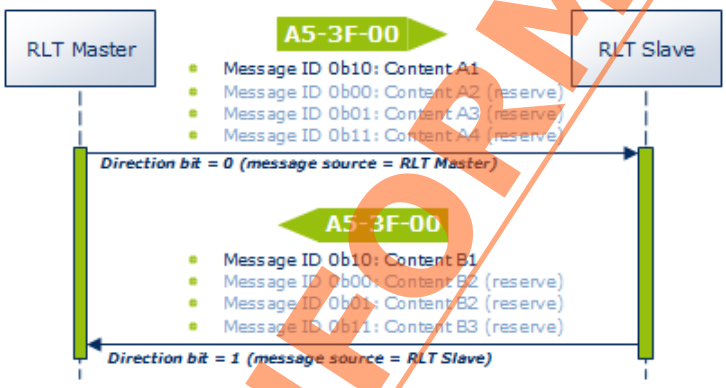
The original terminology 'transmit mode / receive mode' was not taken over, as no unique assignment to device type and hence to transmission direction can be derived there from. A neutral number (Direction 1 / 2) or the state of a bit should allow the required free space to the individual application.

Variant 1:



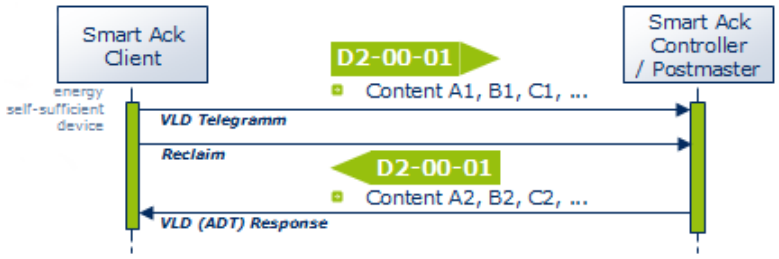
In Variant 1, there is no data-technical differentiation option in the 4BS telegram between Direction 1 and Direction 2, but only a documentation-related direction specification. No transmission direction can be detected if the telegrams are monitored on the radio stretch.

Variant 2:



In Variant 2, 3 bits are provided in the 4BS telegram, which allow up to 8 different data interpretations of the same EEP Profile No. through bit combination. 1 bit is used for direction (with the instruction text 'message source') and 2 bits for the Message ID.

Variant 3:



In Variant 3, the Smart Ack technology normally offers multiple use options of bidirectional data transmission. Smart Ack clients can therefore be energy self-sufficient devices. The used VLD telegrams allow a payload of up to 14 bytes (12.5 bytes with Manufacturer ID). Contents can thus be structured more individually.

3.12) MSC telegram - Manufacturer Specific Communication

Communication over MSC telegrams can always be used when bigger data volumes are to be transmitted, and at the same time, a closed system structure is to be created. This can be the case if e.g., the controller system backbone is expanded to include radio components, or if safety-related controls require proprietary data structures.

Such communication must not affect any interoperable EEP-based communication and should be identifiable as MSC by any Dolphin-based hardware.

Interoperability Conditions:

A device using MSC in addition to other EEPs may be marked with the EnOcean ingredient logo, as long as it complies with the rules defined by the EnOcean alliance for such markings. A device using MSC may be marked with the EnOcean ingredient logo even though the manufacturer does not disclose any or all information regarding the MSC payload. However, all other functionality of such a device shall comply with the latest EEP specification and such a device shall support at least one additional EEP. The manufacturer must clearly state which EEP(s) the device complies with. To safeguard interoperability, if there is sufficient justified doubt within the EnOcean Alliance TWG, a specific unit using MSC can be assessed by the TWG and if found to breach the interoperability intentions, the TWG may then decide (majority vote) to adapt the rules for the usage of the interoperability logo.

The MSC telegram has the same structure as a VLD telegram. The only difference is that the RORG Number is different and the payload specification is missing.

MSC

RORG	Manufacturer ID	Variable data	Sender ID				Status	CRC8
D1	1,5 byte	1 ... 12,5 bytes	ID_3	ID_2	ID_1	ID_0	1 byte	1 byte

The following points are to be noted:

1. The usage of the Multi User Manufacturer ID (0x7FF) shall not be allowed.
2. Each user may send MSC telegrams under his own Manufacturer ID. The Manufacturer ID should not be left out.

3.13) Manufacturer ID's

This chapter was transferred into a separate document entitled **EnOcean Manufacturer Identification (ManID)**. This document will be updated as soon as a new ManID will be allocated to a member of the EnOcean Alliance. The document **EnOcean Manufacturer Identification (ManID)** is stored in the webspace of the TWG on http://portal.enocean-alliance.org/MyWorkGroups/Documents.aspx
(access only for registered members of the TWG).

3.14) XML + DOC Maintenance process

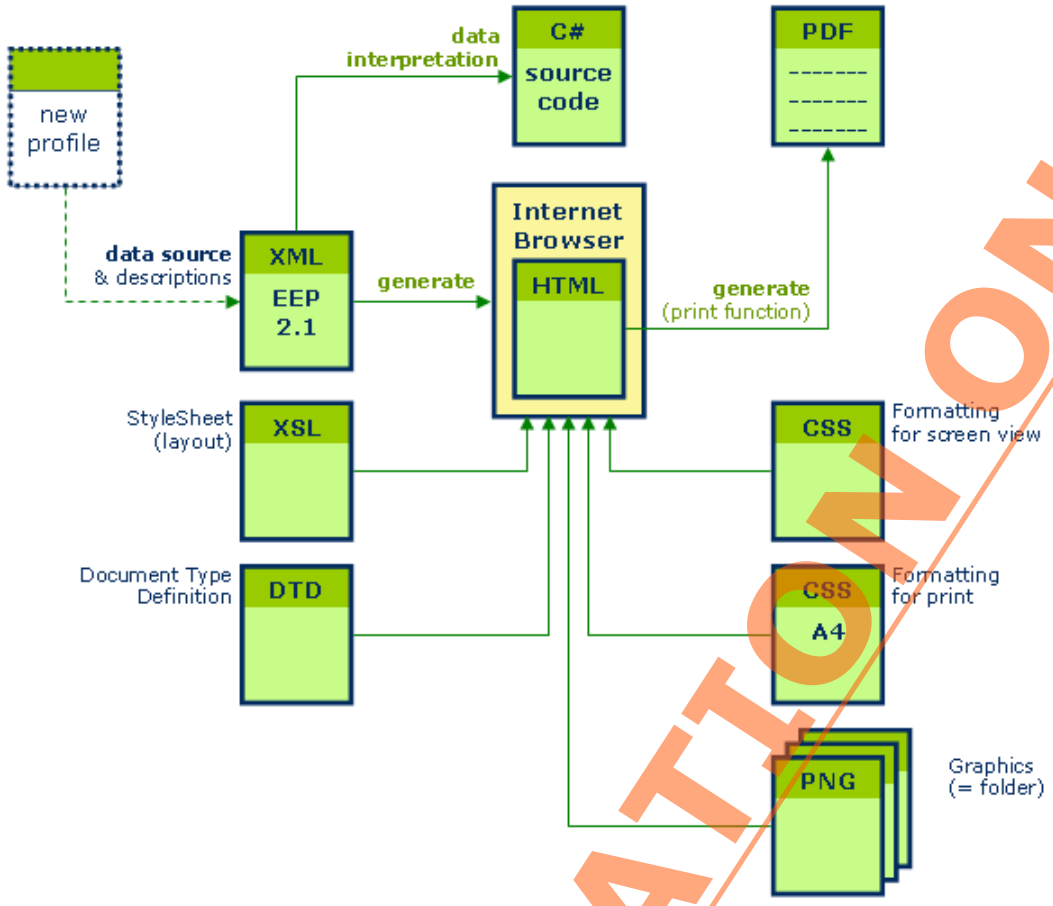
3.14.1) General

The maintenance process is descripted separately in the document: EEP2x_Maintenance_Process.pdf.

3.14.2) XML file

With EEP 2.1, a new type of documentation is introduced, which can also display logical structures next to the described contents. These can be adapted by developers into their programming environment.

XML is fully compatible with applications like C# or JAVA, and it can be combined with any application which is capable of processing XML irrespective of the platform it is being used on. If the application can work alongside XML, then XML can work on any platform and has no boundaries. It is also vendor independent and system independent.



Only the XML data is edited and released in defined time intervals as a total release under a new version. A styles sheet file (XSL) and formatting specifications (CSS) ensure that an attractive HTML representation is possible in an internet browser. The author of the new version also creates a final PDF file.
This method ensures that the document view, as well as the software environment, remain synchronized. Errors are strongly reduced and data maintenance is optimized.

3.15) Revision

Rev.	Date	Editor	Major Changes
0.10		GT	Initial EnOcean Alliance Version created, based on the EnOcean GmbH document 'Standardization EnOcean Communication Profiles_v1.04'
0.90		TR	EEP for ORG = 0x05 added EEP for ORG = 0x06 added Headlines and Text formatted
0.91		TR	FUNC = 11 “Controller Status” added Proposals added: EEP 07-11-01 “Lightning Controller” (EchoFlex) EEP 07-02-0C “Temp.Sensor, Window Contact” (EchoFlex) EEP 07-10-0A “Temp. Sensor, Set-Point Adj., Window Contact” (EchoFlex) EEP 07-30-02 “Window Contact, Single Input” (EchoFlex)
0.92		TR	Manufacturer ID: Guidelines added. Definitions updated Revision History moved to a separate document chapter INPUT document for Berlin Meeting April 2009
2.0R		TR	EEP 07-02-0C shifted to Room Operating Panels -> EEP 07-10-0B EEP 06-00-00 renamed to 06-00-01 EEP 05-xx-xx (PRS telegram / PTM200) updated with results of latest discussions EEP 05-04-01 (Key Card Activated Switch) updated Proposals Added: EEP 07-10-0C “Temp. Sensor, Occupancy Control“ (Termokon) EEP 07-10-0D “Temp. Sensor, Day/Night Control“ (Termokon) Ratification info and period added
2.0	July 2009		Creation of final Version V2.0 EEP 05-03-02 added EEP 05-04-01 corrected EEP 06-00-01 renamed Single Input Contact EEP 07-10-0A and EEP 07-10-0B updated Single Input Contact EEP 07-30-01 and EEP 07-30-02 updated Single Input Contact 4BS teach in Telegram updated FUNC /TYPE Editorial corrections
2.1 R1	Nov 12, 2010	Op	The EEP 2.0 document as well as all 2.1 single documents were transferred to an XML data structure and standardized. The following chapters were re-written: Introduction, Teach-in, Bi-directional profiles, Smart Ack, RPC and MSC. Profiles that are still being coordinated were also accepted. These are characterized as 'Not approved' in the document. Bidirectional profiles are labeled with 'BI-DIR'. RPS ORG 05 = RORG F6; 1BS ORG 06 = RORG D5; 4BS ORG 07 = RORG A5
2.1 R2	Dec 31, 2010	Op	2th review
2.1	Jan 20, 2011	Op	Final version V2.1
2.5 R1	May 20, 2012	Op	Review version 1 Added profiles: - 1 RPS: F6-02-03 - 16 4BS: A5-07-02, A5-09-02, A5-09-05, A5-09-06, A5-09-07, A5-10-1F, A5-11-03, A5-11-04, A5-14-01, A5-14-02, A5-14-03, A5-14-04, A5-14-05, A5-14-06, A5-38-08 CMD 0x07, A5-38-09 - 15 VLD: D2-01-00 ... -11, D2-01-00 ...-02 Updated profiles: A5-07-01, A5-09-01, A5-09-04 Further: - Description: UTE – Universal Uni- and Bidirectional Teach-in - RPC function no. added - Manufacturer ID's added
2.5 R2	Nov 08, 2012	Op	Review version 2 Significant changes: - Chapter 1.3 - Add new profiles: A5-06-03, A5-07-03, A5-13-07 - Update of profiles: A5-10-15, A5-10-16, A5-10-17, A5-13-01, A5-13-05
2.5 R3	Feb 03, 2013	Op	Significant changes: - Add new profiles: D2-03-00, D2-20-00, D2-20-01, D2-20-02 - Update of profiles: A5-07-02, A5-13-02, D2-01-00 - Deleted Chapter ´Manufacturer ID's´

2.5	March 04, 2013	Op	FINAL version 2.5
2.6 R1	Nov 26, 2013	Op	Review version
2.6	Dec 17, 2013	Op	FINAL version 2.6
2.6.1 R1	Apr 15, 2014	Op	Review version
2.6.1 R2	Apr 27, 2014	Op	2nd review version / contains EnOcean checking
2.6.1	Jun 04, 2014	Op	FINAL version 2.6.1
2.6.2 R1	Oct 15, 2014	Op	Review version
2.6.2	Nov 19, 2014	Op	FINAL version 2.6.2
2.6.3 R1	May 03, 2015	Op	Review version
2.6.3 R2	May 19, 2015	Op	2nd Review version: - New: A5-09-0A, A5-09-0B - Modified: A5-30-06 (previous A5-0B-01) submitter, encryption, security, graphic of case 2 - Modified: D2-32-xx Enum structur
2.6.3	Jun 08, 2015	Op	FINAL version 2.6.3 - Removed: A5-30-06 (withdrawn profile)
2.6.4 R1	Oct 13, 2015	Op	Review version
2.6.4	Dec 17, 2015	Op	FINAL version 2.6.4
2.6.5 R1	Apr 07, 2016	Op	Review version
2.6.5	May 02, 2016	Op	FINAL version 2.6.5
2.6.6 R1	Oct 16, 2016	Op	Review version
2.6.6 R2	Nov 09, 2016	Op	2nd review version
2.6.6	Nov 17, 2016	Op	3th version
2.6.6	Dec 12, 2016	Op	FINAL version 2.6.6
2.6.7 R1	May 04, 2017	Op	Review version
2.6.7	May 20, 2017	Op	FINAL version 2.6.7