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# WMBUS DATA FORMAT

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REPEATER (FX-WMBUS-Rx-X-X-Ax)



## Verify correct device and version

This document applies to our repeaters FX-WMBUS-R\*\*\* with protocol version 11 (0x0B). There are two ways of finding out the protocol version of the device; either by looking at the label on the device or by looking at the data packets sent out by the device. See chapters **Protocol version in data packets** and **Protocol version in label** below for more information.

### Protocol version in data packets

If it is possible to check the information in the data packets sent out by the device, then the protocol version is included in the data field called *A-Field Protocol version*. See chapter **WMBUS-format: Status packet**.

### Protocol version in label

The protocol version can be found on the label. An example of a label is shown in the figure below and the relevant information is described by LAS.00046038.32.0B, where

- **Manufacturer code:** LAS
- **Serial number:** 00046038
- **Device type:** 0x32 (50)
- **Protocol version:** 0x0b (11)



## WMBUS-format: Status packet

A Fidelix repeater transmits a so called “*status packet*” once every minute. This packet contains information about the repeater, such as number of routed packets, (current battery level), and the current time on the repeater. It also includes the signal strength between repeaters in a multihop setup. If the status packet is retransmitted by another repeater, then the serial number and the received signal strength of the repeater which retransmitted the status packet will be added at the end of this packet (see fields DR10, DR1, DR12, and DR13 in the table below).

Art nr.	FX-WMBUS-R***
Version	11 (0x0B)
Information	Status packet is sent once every minute and is NOT encrypted
DR1	Number of total routed messages since power up
DR2	Used routing slots (maximum 936)
DR3	Software version of repeater
DR4	Is the repeater listening now? (1=Yes, 0=NO)
DR5	Seconds to mode change (Listen→Sleep or Sleep→Listen). Maximum 32767 seconds
DR6	Value on parameter “Listen timer”
DR7	Value on parameter “Pause timer”
DR8	Shows which weekday(s) repeater is listening. See Error! Reference source not found. for more information
DR9	Value on parameter “Start time”, shown as minutes after midnight (-1=Not used)
DR10	Current time
DR11	Current battery level
DR12	Serial number of the first repeater which retransmitted the status packet. <b>Note:</b> This field is only added if the repeaters are used in a multihop setup.
DR13	Received signal strength of the first repeater which retransmitted the status packet. <b>Note:</b> This field is only added if the repeaters are used in a multihop setup.
DR14	Serial number of the second repeater which retransmitted the status packet. <b>Note:</b> This field is only added if the repeaters are used in a multihop setup.
DR15	Received signal strength of the second repeater which retransmitted the status packet. <b>Note:</b> This field is only added if the repeaters are used in a multihop setup.

Byte	Field Name	Content	Info	Byte data	
1	L-Field	Length			Linklayer
2	C-Field	SND-NR		0x44	
3	M-Field	Manufacturer code	LAS	0x33	
4	M-Field	Manufacturer code		0x30	
5	A-Field	Serial number (LSB)	<b>Example:</b> 00010067	0x67	
6	A-Field	Serial number		0x00	
7	A-Field	Serial number		0x01	
8	A-Field	Serial number (MSB)		0x00	
9	A-Field	Protocol version		0x0B	
10	A-Field	Unidirectional Repeater		0x32	
11	CI-Field	Short header		0x7A	Networklayer
12	Access no.	Transmission counter.	<b>Example:</b> 7	0x07	
13	Status	Errors and alerts	See <b>Table 1</b> for more information.	0x00	
14	Configuration			0x00	
15	Configuration			0x00	
16	AES-Verify	Encryption Verification		0x2F	
17	AES-Verify	Encryption Verification		0x2F	
18	DR1	DIF	32-bit integer	0x04	
19	DR1	VIF	Extension table	0xFD	
20	DR1	VIFE	Dimensionless	0x3A	
21	DR1	Value (LSB)		0x00	
22	DR1	Value		0x00	
23	DR1	Value		0x00	
24	DR1	Value (MSB)		0x00	
25	DR2	DIF	16-bit integer + Extension	0x82	
26	DR2	DIFE	Subunit 1	0x40	
27	DR2	VIF	Extension table	0xFD	
28	DR2	VIFE	Dimensionless	0x3A	
29	DR2	Value (LSB)		0x00	
30	DR2	Value (MSB)		0x00	
31	DR3	DIF	16-bit integer	0x02	
32	DR3	VIF	Extension table	0xFD	
33	DR3	VIFE	Version	0x0F	
34	DR3	Value (LSB)		0x00	
35	DR3	Value (MSB)		0x00	
36	DR4	DIF	8-bit integer + Extension	0x81	
37	DR4	DIFE	Subunit 2	0x80	
38	DR4	DIFE		0x40	
39	DR4	VIF	Extension table	0xFD	
40	DR4	VIFE	Dimensionless	0x3A	
41	DR4	Value		0x75	
42	DR5	DIF	32-bit integer + Extension	0x84	

43	DR5	DIFE	Subunit 3	0xC0
44	DR5	DIFE		0x40
45	DR5	VIF	Extension table	0xFD
46	DR5	VIFE	Dimensionless	0x3A
47	DR5	Value (LSB)		0x00
48	DR5	Value		0x00
49	DR5	Value		0x00
50	DR5	Value (MSB)		0x00
51	DR6	DIF	16-bit integer + Storage 1	0x42
52	DR6	VIF	Extension table	0xFD
53	DR6	VIFE	Dimensionless	0x3A
54	DR6	Value (LSB)		0x00
55	DR6	Value (MSB)		0x00
56	DR7	DIF	16-bit integer + Extension	0x82
57	DR7	DIFE	Storage 2	0x01
58	DR7	VIF	Extension table	0xFD
59	DR7	VIFE	Dimensionless	0x3A
60	DR7	Value (LSB)		0x00
61	DR7	Value (MSB)		0x00
62	DR8	DIF	8-bit integer + Storage + Extension	0xC1
63	DR8	DIFE	Storage 3	0x01
64	DR8	VIF	Extension table	0xFD
65	DR8	VIFE	Dimensionless	0x3A
66	DR8	Value		
67	DR9	DIF	16-bit integer + Extension	0x82
68	DR9	DIFE	Storage 4	0x02
69	DR9	VIF	Extension table	0xFD
70	DR9	VIFE	Dimensionless	0x3A
71	DR9	Value (LSB)		0xFF
72	DR9	Value (MSB)		0xFF
73	DR10	DIF	48-bit integer	0x06
74	DR10	VIF	Time Type I format	0x6D
75	DR10	Current Time	<b>Example:</b> 2001-01-01 00:01:02	0x02
76	DR10	Current Time		0x01
77	DR10	Current Time		0xC0
78	DR10	Current Time		0x01
79	DR10	Current Time		0x01
80	DR10	Current Time		0x00
81	DR11	DIF	16-bit integer	0x02
82	DR11	DIFE	Extension table	0xFD
83	DR11	VIF	Voltage (mV)	0x46
84	DR11	Value (LSB)		0x00
85	DR11	Value (MSB)		0x00
86	DR12	DIF	8-digit BCD	0x0C
87	DR12	VIFE	Serial number	0x78
88	DR12	Value (LSB)		0x00
89	DR12	Value		0x00
90	DR12	Value		0x00
91	DR12	Value (MSB)		0x00
92	DR13	DIF	8-bit integer	0x01
93	DR13	VIF Field Extension	Extension table	0xFD
94	DR13	VIF Field RSSI	RSSI	0x71
95	DR13	Value		0x00
96	DR14	DIF	8-digit BCD	0x0C
97	DR14	VIFE	Serial number	0x78
98	DR14	Value (LSB)		0x00
99	DR14	Value		0x00
100	DR14	Value		0x00
101	DR14	Value (MSB)		0x00
102	DR15	DIF	8-bit integer	0x01
103	DR15	VIF	Extension table	0xFD
104	DR15	VIF	RSSI	0x71
105	DR15	Value		0x00

DR12 and DR13 are only appended if packet is received and retransmitted from another repeater

DR14 and DR15 are only appended if packet is received and retransmitted from another repeater

Table 1: Explanation of status bits used by the repeater

Bit	Info
0 (0x01)	X
1 (0x02)	X
2 (0x04)	Low battery
3 (0x08)	X
4 (0x10)	X
5 (0x20)	X
6 (0x40)	X



## Version history

Version	Date	Name	Info
11.1	11.11.2022	Juha Rajanen	First version of the document.