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# WMBUS DATA FORMAT

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## OCCUPANCY DETECTOR: FX-WMBUS-OD-PIR



## Verify correct device and version

This document applies to the device FX-WMBUS-OD-PIR with protocol version 4. 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*. For more information, see chapter **WMBUS-format**.

### Protocol version in label

The protocol version can be found on the label. An example of a label is shown in the figure below. Scanning the QR-code reveals the information regarding the device, in this case LAS.02006742.1F.04, where

- **Manufacturer code:** LAS
- **Serial number:** 02006742
- **Device type:** 0x1F (31)
- **Protocol version:** 0x04 (04)



## WMBUS-format

|             |   |
|-------------|---|
| Art nr.     | FX-WMBUS-OD-PIR   |
| Version     | 4 (0x04)  |
| Information | <p>Packet is sent synchronous every 120 seconds in C-mode, format A (T-mode, format A on request).</p> <p>Packet is also sent asynchronous if device detects movement for the first time in 10 minutes.</p>   |
| DR1         | <b>Motion detected:</b> Active if motion was detected past five minutes.  |
| DR2         | <b>Current alarm status:</b> Shows if motion has been detected within certain time interval.  |
| DR3         | <b>Number on minutes with activity in a row:</b> If motion has been detected during a 10-minute period, it counts as activity.  |
| DR4         | <b>Number of minutes since last alarm:</b> Stops counting at 65535 minutes (approximately 64 days).   |
| DR5         | <p><b>Total number of motion detections (slow):</b> Increments maximum every 5 minutes, i.e., a new movement can be detected when 5 minutes passed since the last movement.</p> <p><b>Note:</b> This counter will wrap when the value 65535 is reached.</p>   |
| DR6         | <p><b>Total number of motion detections (fast):</b> Increments maximum every 10 seconds, i.e., a new movement can be detected when 10 seconds passed since the last movement.</p> <p><b>Note:</b> This counter will wrap when the value 65535 is reached.</p> |
| DR7         | <b>On time:</b> Number of days since last startup. Resets if batteries are removed and reinserted.  |
| DR8         | <b>Total on time:</b> Number of days since first startup. Does not reset if batteries are removed.  |
| DR9         | <b>Version</b>  |

| Byte No | Field Name    | Content                      | Info  | Byte Data |                 |
|---------|---------------|------------------------------|---|-----------|-----------------|
| 1.      | L-Field       | Length                       |   |           | Link layer      |
| 2.      | C-Field       | SND-NR                       |   | 0x44      |                 |
| 3.      | M-Field       | Meter Manufacturer code      | LAS   | 0x30      |                 |
| 4.      | M-Field       | Meter Manufacturer code      |   | 0x33      |                 |
| 5.      | A-Field       | Meter serial number (LSB)    | <b>Example:</b> 0001067                     | 0x67      |                 |
| 6.      | A-Field       | Meter serial number          |   | 0x00      |                 |
| 7.      | A-Field       | Meter serial number          |   | 0x01      |                 |
| 8.      | A-Field       | Meter serial number (MSB)    |   | 0x00      |                 |
| 9.      | A-Field       | Protocol version             |   | 0x0A      |                 |
| 10.     | A-Field       | Meter type                   | Motion sensor                               | 0x1F      |                 |
| 11.     | CI-Field      | Short header                 |   | 0x7A      | Network layer   |
| 12.     | Access no.    | Transmission counter         | Example: 7                                  | 0x07      |                 |
| 13.     | Status        | Device status (error/alarms) | Refer to <b>Table 1</b> for possible values | 0x00      |                 |
| 14.     | Configuration | Number of encrypted blocks   | Example: 3                                  | 0x03      |                 |
| 15.     | Configuration | Encryption                   | Encryption mode 5 + Synchronized:<br>0x25   | 0x25      |                 |
| 16.     | AES-Verify    | Encryption Verification      |   | 0x2F      |                 |
| 17.     | AES-Verify    | Encryption Verification      |   | 0x2F      |                 |
| 18.     | DR1           | DIF                          | 8-bit integer                               | 0x01      | Motion detected |
| 19.     | DR1           | VIF                          | Extension table                             | 0xFD      |                 |
| 20.     | DR1           | VIFE                         | Digital Input                               | 0x1B      |                 |
| 21.     | DR1           | Value                        | No alarm = 0<br>Alarm = 1                   | 0x01      |                 |
| 22.     | DR2           | DIF                          | 16-bit integer Storage 1                    | 0x42      |                 |

|     |            |             |   |      |   |
|-----|------------|-------------|---|------|---|
| 23. | DR2        | VIF         | Extension table                             | 0xFD | Current alarm status                        |
| 24. | DR2        | VIFE        | Digital Input                               | 0x1B |   |
| 25. | DR2        | Value (LSB) | Refer to <b>Table 2</b> for possible values | 0x00 |   |
| 26. | DR2        | Value (MSB) |   | 0x00 |   |
| 27. | DR3        | DIF         | 16 Bit integer + storage 2                  | 0x82 | PIR active minutes                          |
| 28. | DR3        | DIFE        | Storage 2                                   | 0x01 |   |
| 29. | DR3        | VIF         | Extension                                   | 0x02 |   |
| 30. | DR3        | VIFE        | Dimensionless                               | 0xFD |   |
| 31. | DR3        | Value (LSB) | <b>Example:</b> 288 minutes (0x0120)        | 0x20 |   |
| 32. | DR3        | Value (MSB) |   | 0x01 |   |
| 33. | <b>DR4</b> | <b>DIF</b>  | 16 Bit integer + storage 3                  | 0xC2 | PIR minutes since alarm                     |
| 34. | <b>DR4</b> | <b>DIFE</b> | storage 3                                   | 0x01 |   |
| 35. | DR4        | VIF         | Extension                                   | 0x02 |   |
| 36. | DR4        | VIFE        | Dimensionless                               | 0xFD |   |
| 37. | DR4        | Value (LSB) | <b>Example:</b> 30 minutes (0x1E)           | 0x1E |   |
| 38. | DR4        | Value (MSB) |   | 0x00 |   |
| 39. | DR5        | DIF         | 16 Bit integer + storage 4                  | 0xC2 | PIR total number of motions detected (slow) |
| 40. | DR5        | VIF         | Extension                                   | 0x02 |   |
| 41. | DR5        | VIFE        | Dimensionless                               | 0xFD |   |
| 42. | DR5        | Value (LSB) | <b>Example:</b> 260 times (0x0104)          | 0x04 |   |
| 43. | DR5        | Value (MSB) |   | 0x01 |   |
| 44. | DR6        | DIF         | 16 Bit integer + storage 5                  | 0xC2 | PIR total number of motions detected (fast) |
| 45. | DR6        | VIF         | Extension                                   | 0x02 |   |
| 46. | DR6        | VIFE        | Dimensionless                               | 0xFD |   |
| 47. | DR6        | Value (LSB) | <b>Example:</b> 400 times (0x0190)          | 0x90 |   |
| 48. | DR6        | Value (MSB) |   | 0x01 |   |
| 49. | DR7        | DIF         | 16-bit integer                              | 0x02 | On time (days)                              |
| 50. | DR7        | VIF         | On Time Days                                | 0x23 |   |
| 51. | DR7        | Value (LSB) | <b>Example:</b> 2 days (0x0002)             | 0x02 |   |
| 52. | DR7        | Value (MSB) |   | 0x00 |   |
| 53. | DR8        | DIF         | 16-bit integer                              | 0x02 | Total on time (days)                        |
| 54. | DR8        | VIF         | Total Operating Time Days                   | 0x27 |   |
| 55. | DR8        | Value (LSB) | <b>Example:</b> 4 days (0x0004)             | 0x04 |   |
| 56. | DR8        | Value (MSB) |   | 0x00 |   |
| 57. | DR9        | DIF         | 16-bit integer                              | 0x02 | Version (build ID)                          |
| 58. | DR9        | VIF         | Extension table                             | 0xFD |   |
| 59. | DR9        | VIFE        | Version                                     | 0x0F |   |
| 60. | DR9        | Value (LSB) | <b>Example:</b> 0x0004                      | 0x04 |   |
| 61. | DR9        | Value (MSB) |   | 0x00 |   |

**Table 1: Status byte with errors and alerts**

| Bit      | Info |
|----------|------|
| 0 (0x01) | X    |
| 1 (0x02) | X    |

|          |                                      |
|----------|--------------------------------------|
| 2 (0x04) | Low battery                          |
| 3 (0x08) | X                                    |
| 4 (0x10) | X                                    |
| 5 (0x20) | Motion detected past 120-240 seconds |
| 6 (0x40) | Motion detected past 10 minutes      |
| 7 (0x80) | Motion detected past 24 hours        |

**Table 2: Meaning of bits for current alarm status (DR2)**

| Bit      | Info                                 |
|----------|--------------------------------------|
| 0 (0x01) | Motion detected past 120-240 seconds |
| 1 (0x02) | Motion detected past 10 minutes      |
| 2 (0x04) | Motion detected past 60 minutes      |
| 3 (0x08) | Motion detected past 24 hours        |

## Version history

| Version | Date       | Name         | Info                           |
|---------|------------|--------------|--------------------------------|
| 4.1     | 11.11.2022 | Juha Rajanen | First version of the document. |