Honeywell
THE POWER OF CONNECTED

FALCON (MJ) Pulse/M-Bus operating instructions for FW 3 and newer

M-Bus modules for Honeywell / Elster
M100i/M120i; S150/S220; V200/V210 and H4000 waters meters

Content

1 Description of functions

The Falcon MJ Pulse/M-Bus makes it possible to read out Honeywell / Elster water meters M100i and M120i in a M-Bus system or via a digital pulse output. The FALCON Pulse /M-Bus makes it possible to read water meters S150/S220; V200/V210 and H4000 water meters in a M-Bus system or via a digital pulse output.

FALCON Pulse/M-Bus

FALCON MJ Pulse/M-Bus

Once the meter index is configured via the M-Bus, the Falcon will transfer the exact meter index shown on the water meter's register.

Another feature of the Falcon is its due date function. The user can program an annual due date. In conjunction with the unit's real-time clock with calendar function, the meter's current index will be specially stored on the configured date at 00:00 (change of day to the reporting date).

When the module is connected to a M-Bus network, the device gets its power from the M-Bus. The internal battery backs up operation even when the M-Bus has a failure. The battery is already activated when the unit is delivered.

The Falcon stores the meter index on the first day of every month at 00:00.
The modules offer two different telegram types which are selectable by the user: The long telegram contains all values, including monthly values. The short telegram does not contain any monthly values. Even though the short telegram type may be selected, monthly values are stored internally and are available later for read out if the telegram type is changed.

2 Installation and commissioning

2.1 Installing Falcon MJ Pulse/M-Bus

Refer to the separate installation instructions inside the package.

2.2 Installing Falcon Pulse/M-Bus

Refer to the separate installation instructions inside the package.

2.3 Connection

The Falcon will be delivered with a permanently attached 5 wires cable, 3m length. The yellow and green M-Bus wires can be connected with e.g. suitable distribution terminal strips. The polarity of the M-Bus wires is irrelevant.

3 Configuration with HON Wired MBUS Config Generator

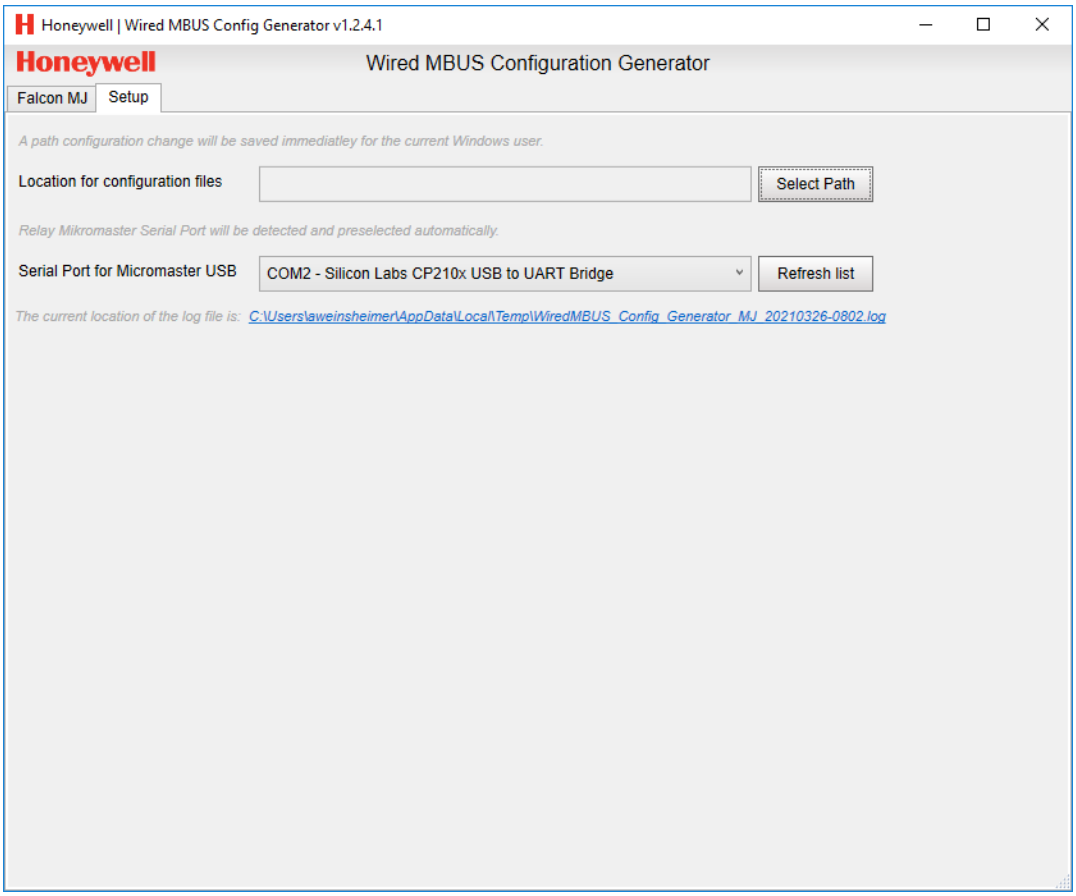
This device's configuration must be adapted by the customer to the given meter. This can be done, for example, with the HON tool “Wired MBUS Config Generator”, which will be described below.

3.1 Installation

The configuration software can be executed on Windows 10 operating system. The desktop or laptop PC to be used must have a free USB interface connection. This interface connection must be connected to an M-Bus level converter (MR003 USB / MikroMaster).
The Falcon device which will be configured must have a point-to-point (1:1) connection (i.e. be the only M-Bus device attached) to the M-Bus output of the level converter.

Please ask your Honeywell contact to get access to our software.

3.2 Setup screen



The COM Port of the Mikromaster is automatically detected. You can also select the COM port manually if need.

It is possible to create configuration files with this tool as well. You can select the standard folder for the Config files on this screen as well

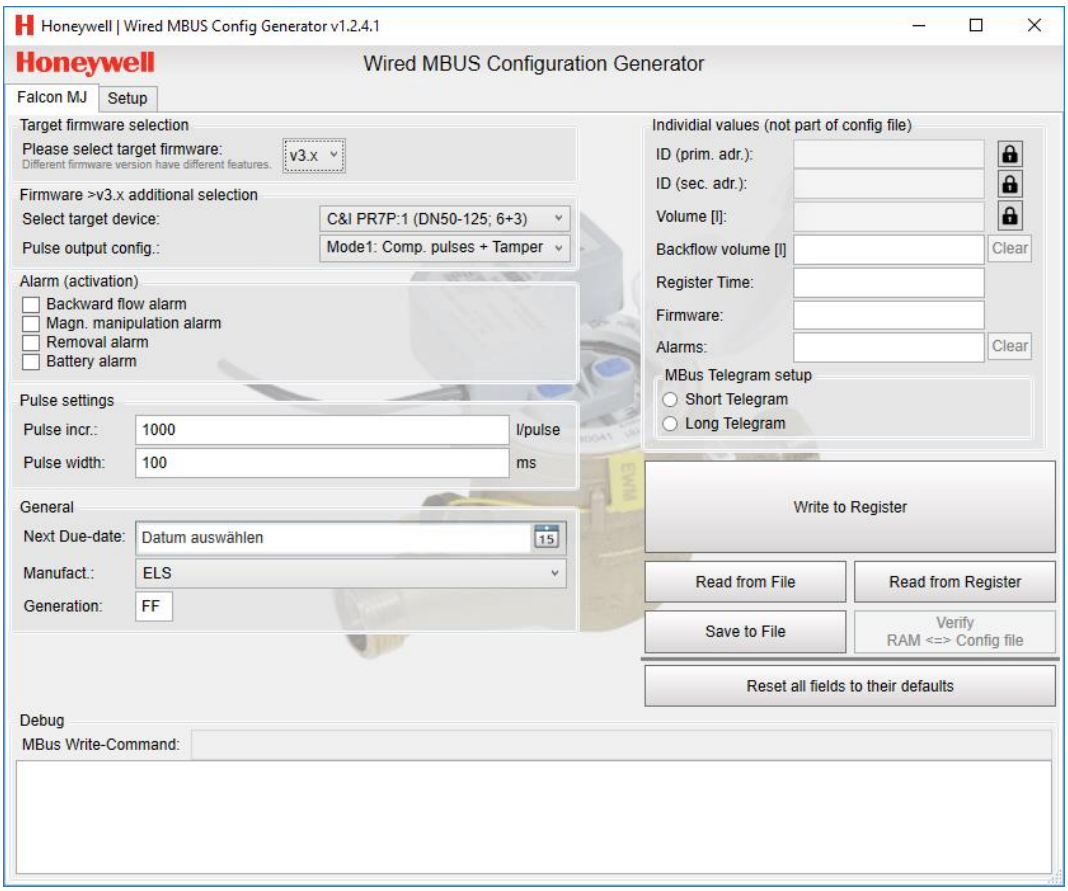
M-Bus address

is the primary M-Bus address for the attached M-Bus device. In a 1:1 connection (1 adapter on the M-Bus), the broadcast address 254 can be used. Every M-Bus terminal device must respond to the address 254. The default setting for this address in the program is 254.

Log window

The so-called "Debug window" is always visible. All M-Bus communication telegrams will be recorded in this window. Data will be displayed in hexadecimal representation. Output in the log window can be marked and then stored in the Windows clipboard with the "CTRL+C" key combination. From the clipboard it is easy to paste the data into a text processing program for documenting purposes. As soon as this window has reached its storage capacity, no more data will be entered. The displayed data must be deleted in order to allow recording to continue.

3.3 Falcon (MJ) tab



The main screen allows you to read the current settings of a module, write new settings to a module or to generate a config file.
Today, 3 different firmware generations are in the field. When you connect a device and read the settings the firmware version is automatically identified.
Each Firmware generation has a different set of features. The screen is automatically updated according to the selected firmware version.
The firmware version that is used by the module is shown on the label on top of the module.

Remark: The Firmware will be automatically detected after the first reading

3.3.1 Config file (profile) settings

Target firmware.

is the target firmware version. For Falcon Pulse/M-Bus always 3.x.

Select target device

is the target type of the meter Residential or C&I, with the possible K factors.

Pulse output configuration

is the output configuration of the target modules.
Mode1: Channel 1 is working in compensated (F-R) mode, second as tamper flag
Mode2: Channel 1 is working in all pulses (F+R) mode, second as direction flag
Mode3: Channel 1 is working in forward pulses mode, second in backward pulses mode
Mode4: Both channels are working in compensated pulses (F-R) mode

Alarm activation

The type of the alarm the module will detect and report.
Backward: if the module is detecting backward flow.
Magnetic manipulation alarm: detecting the manipulation of the module by a magnetic source
Removal alarm: if the module is detecting that it was removed from meter
Battery alarm: is reporting an alarm in case of a week battery (app. 6 months before end of lifetime).

Pulse settings

Pulse incr: is the weight of the pulse = pulse ratio (in l/pulse). The higher the ratio, the less the granularity. All integer values between 1 and 1000 liters are possible
Pulse width: is the length in milliseconds the open collector transistor is closed when the module is pulsing.
The pulse width can be set between 5 and 500 ms. The setting of pulse incr. and pulse width must be plausible, depending on the meter size and max flow rate values.
Example: For a Q3 10; DN25 meter with a Q4 value of 12,5 m^3/h

12,5m^3/h → app. 3,5 l/s
Pulse output 1 liter → max. possible pulse width 140 ms (smaller values are possible)

If a pulse overcount would happen, the pulser stores the pulses and sends them to the output when the flow rate decreases again. The internal storage for this pulse counter is 65.535 pulses.

These two values reconfigure the pulse output signal (wires white and brown)
White wire → Pulse (+)
Brown wire → Ground (-)
Max contact load: 30 V DC / 30mA
Default setting for pulse output on FALCON MJ: 1 liter per pulse; 100ms pulse width

Default setting for pulse output on FALCON Pulse/M-Bus: 1000 liters per pulse; 100ms pulse width; Mode 1; C&I compatibility for DN 50-125

For the pulse output open drain transistor is used. The polarity must be considered.
The pulse output is compatible to most systems that were used with a Reed-switch before

Next due-date

is the next due date (i.e. date for the next storage of meter index) in the format DD.MM.YY. Storing will take place at 00:00 on the due date, e.g. if next reporting day is 01.01. then following a change from 31.12. 23:59 to 01.01. at 00:00.

Manufacturer/Generation

The manufacturer and generation identifiers of the Falcon module can be changed. For the manufacturer, the following manufacturer codes are possible: ELR, ELS, EMT, HON.
This possibility allows the customer to set up the identification of the module according the DIN 43863-5, meter serial numbers

3.3.2 Individual values (of the connected module)

ID (primary address)

is the M-Bus address of the Falcon. A value between 0 and 250 can be entered into this field if the primary address needs to be changed. Click on "Write" control button will transfer the primary address and other alterable settings on this tab card to the Falcon MJ module. The addresses 253, 254 and 255 are broadcast addresses.

- 253 -> deselect all slaves
- 254 -> select all slaves
- 255 -> select all slaves without confirmation (0xE5).

ID (sec.adr.)

is an 8-character M-Bus ID used for secondary addressing on the Falcon. We recommend that the serial number of the connected water meter is programmed here.
Default: Secondary address is set as the last 8 digits of the module´s SN

Register time

is the current date and time inside the module

Firmware

This is the firmware version of the module just read out.

Backflow volume (backward)

This is the meter index in liters, for backflow. It can be reset by clicking the button “Clear”.

Volume

This is the meter index in liters

Alarms

displays the current alarms. They can be reset by clicking the button “Clear”

MBus Telegram setup/Short telegram.

information if the mode for the M-Bus protocol on the Falcon is set to short telegram (without monthly values)

MBus Telegram setup/Long Telegram

Information if the mode for M-Bus protocol on the Falcon to long telegram (with monthly values).

3.3.3 Read/write buttons

Write to Register

Sends the current settings to the module where they will be stored.

Read from file

Reads the configuration from a profile file.

Read from Register

Reads the current settings from the connected module and updates the M-Bus data on the selected tab card.

Save to file

Stores the current configuration to a profile file (to be used for a batch of modules). The path for the profile files may be set in the setup tab page (see chapter 3.2).

Reset all fields

stored parameters will be cleared to factory default

4 M-Bus telegrams

4.1 SND_UD: Send User data; telegram selection

4.1.1 Select Normal readout (Short telegram)

SND-UD (M-Bus)

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Send user data	53h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	Application Select (long Header)	53h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	B1h	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	
19	Config Field	no Encryption	00h	
20		Subcode	20h	
21	Checksum		xxh	DLL
22	Stop	Stop byte	16h	

4.1.2 Select Enhanced readout (Long telegram)

SND-UD (M-Bus)

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Send user data	53h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	Application Select (long Header)	53h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	B1h	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	
19	Config Field	no Encryption	00h	
20		Subcode	30h	
21	Checksum		xxh	DLL
22	Stop	Stop byte	16h	

4.1.3 Reset alarms

SND-UD (M-Bus)

	OMS M-Bus frame	Water meter example	Layer
Field Name	Content	Bytes [hex]	
		plain	
Start	Start byte	68h	Data Link Layer (DLL)
L Field	Length of data (xx bytes)	xxh	
L Field	Length of data (xx bytes)	xxh	
Start	Start byte	68h	
C Field	Send user data	53h	
A-Field	Secondary addressing mode	FDh	
CI Field	Application Select (long Header)	53h	Transport Layer (TPL)
Ident.Nr.	Ident No LSB (BCD)	78h	
Ident.Nr.	Ident No (BCD)	56h	
Ident.Nr.	Ident No (BCD) (=12345678)	34h	
Ident.Nr.	Ident No MSB (BCD)	12h	
Manufr	Manufacturer code	92h	
Manufr	Manufacturer code	15h	
Version	Version (or Generation number)	xxh	
Device type	Device type (Medium=Water)	07h	
Access No.	Access number of Meter	2Ah	
Status	M-Bus state	00h	
Config Field	no Encryption	00h	
Config Field	no Encryption	00h	
	Subcode	81h	
Checksum		xxh	DLL
Stop	Stop byte	16h	

4.1.4 Clear historic values (readings and max values)

SND-UD (M-Bus)

	OMS M-Bus frame	Water meter example	Layer
Field Name	Content	Bytes [hex]	
		plain	
Start	Start byte	68h	Data Link Layer (DLL)
L Field	Length of data (xx bytes)	xxh	
L Field	Length of data (xx bytes)	xxh	
Start	Start byte	68h	
C Field	Send user data	53h	
A-Field	Secondary addressing mode	FDh	
CI Field	Application Select (long Header)	53h	Transport Layer (TPL)
Ident.Nr.	Ident No LSB (BCD)	78h	
Ident.Nr.	Ident No (BCD)	56h	
Ident.Nr.	Ident No (BCD) (=12345678)	34h	
Ident.Nr.	Ident No MSB (BCD)	12h	
Manufr	Manufacturer code	92h	
Manufr	Manufacturer code	15h	
Version	Version (or Generation number)	xxh	
Device type	Device type (Medium=Water)	07h	
Access No.	Access number of Meter	2Ah	
Status	M-Bus state	00h	
Config Field	no Encryption	00h	
Config Field	no Encryption	00h	
	Subcode	80h	
Checksum		xxh	DLL
Stop	Stop byte	16h	

4.2 RSP_UD: data transfer on request

4.2.1 Short – telegram for meters 15mm – 125mm (only Firmware 3 and newer)

The used VIF resolution for consumption and flow rate values is in 0.001 m³(/h) → 1 litre (/h) accuracy

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Respond user data	08h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	72h (long header)	72h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	xxh	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	
19	Config Field	no Encryption	00h	
20	DR1	DIF (8 digit INT)	04h	Application Layer (APL)
21	DR1	VIF (Volume l)	13h	
22	DR1	Value LSB	87h	
23	DR1	Value	1Ah	
24	DR1	Value (= 6791 l)	00h	
25	DR1	Value MSB	00h	
26	DR2	DIF (Time at readout; Type F)	04h	
27	DR2	VIF (Date, Time)	6Dh	
28	DR2	Value LSB	32h	
29	DR2	Value	37h	
30	DR2	Value (31.05.2008 23:50)	1Fh	
31	DR2	Value MSB	15h	

32	DR3	DIF (Date Stor. 1;Type G)	42h
33	DR3	VIF (Date)	6Ch
34	DR3	Value	xxh
35	DR3	Value	xxh
36	DR4	DIF (8 digit INT Stor. 1)	44h
37	DR4	VIF (Volume l)	13h
38	DR4	Value LSB	00h
39	DR4	Value	00h
40	DR4	Value (= 0 l)	00h
41	DR4	Value MSB	00h
42	DR5	DIF (Date Stor. 1;Type G)	42h
43	DR5	VIF (Date + Extension)	ECh
44	DR5	VIFE (Future Value)	7Eh
45	DR5	Value	xxh
46	DR5	Value	xxh
47	DR6	DIF (8 digit INT)	04h
48	DR6	VIF (Volume l + Extension)	93h
49	DR6	VIFE (backward flow)	3Ch
50	DR6	Value LSB	09h
51	DR6	Value	5Eh
52	DR6	Value (= 24073 l)	00h
53	DR6	Value MSB	00h
54	DR7	DIF (Date Max. Value; Type G)	12h
55	DR7	VIF (Date)	6Ch
56	DR7	Value	xxh
57	DR7	Value	xxh
58	DR8	DIF (32 bit Int, Max. Value)	14h
59	DR8	VIF (Flow Rate l/h)	3Bh
60	DR8	Value	00h
61	DR8	Value	00h
62	DR8	Value (0 l/h)	00h
63	DR8	Value	00h
64	DR9	DIF (32 Bit Int)	04h
65	DR9	VIF (Flow Rate l/h)	3Bh
66	DR9	Value	00h
67	DR9	Value	00h
68	DR9	Value (0 l/h)	00h
69	DR9	Value	xxh
70	DR10	DIF (Backflow Alarm Date; Type F)	C4h
71	DR10	DIFE (Storage No. 7)	03h
72	DR10	VIF (Date, Time)	6Dh
73	DR10	Value LSB	05h
74	DR10	Value	12h
75	DR10	Value (20.02.00 18:05)	14h
76	DR10	Value MSB	02h
77	DR11	DIF (Manipulation Alarm Date; Type F)	84h

78	DR11	DIFE (Storage No. 6)	03h	
79	DR11	VIF (Date, Time)	6Dh	
80	DR11	Value LSB	3Bh	
81	DR11	Value	11h	
82	DR11	Value (20.02.00 17:59)	14h	
83	DR11	Value MSB	02h	
84	DR12	DIF (Manufacturerspecific)	0Fh	
85	DR12	PBIT	xxh	
86	Checksum		xxh	DLL
87	Stop	Stop byte	16h	DLL

4.2.2 Long – telegram for meters 15mm – 125mm (only Firmware 3 and newer)

Long telegram with monthly values.
The used VIF resolution for consumption and flow rate values is in 0.001 m³(/h) → 1 litre (/h) accuracy

Frame 1:

RSP-UD (M-Bus)

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Respond user data	08h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	72h (long header)	72h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	xxh	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	

19	Config Field	no Encryption	00h	
20	DR1	DIF (8 digit INT)	04h	Application Layer (APL)
21	DR1	VIF (Volume l)	13h	
22	DR1	Value LSB	xxh	
23	DR1	Value	xxh	
24	DR1	Value	xxh	
25	DR1	Value MSB	xxh	
26	DR2	DIF (Time at readout; Type F)	04h	
27	DR2	VIF (Date, Time)	6Dh	
28	DR2	Value LSB	32h	
29	DR2	Value	37h	
30	DR2	Value (31.05.2008 23:50)	1Fh	
31	DR2	Value MSB	15h	
32	DR3	DIF (Date Stor. 1;Type G)	42h	
33	DR3	VIF (Date)	6Ch	
34	DR3	Value	xxh	
35	DR3	Value	xxh	
36	DR4	DIF (8 digit INT Stor. 1)	44h	
37	DR4	VIF (Volume l)	13h	
38	DR4	Value LSB	xxh	
39	DR4	Value	xxh	
40	DR4	Value	xxh	
41	DR4	Value MSB	xxh	
42	DR5	DIF (Date Stor. 1;Type G)	42h	
43	DR5	VIF (Date + Extension)	ECh	
44	DR5	VIFE (Future Value)	7Eh	
45	DR5	Value	xxh	
46	DR5	Value	xxh	
47	DR6	DIF (8 digit INT)	04h	
48	DR6	VIF (Volume l + Extension)	93h	
49	DR6	VIFE (backward flow)	3Ch	
50	DR6	Value LSB	09h	
51	DR6	Value	5Eh	
52	DR6	Value (= 0,003 m^3)	00h	
53	DR6	Value MSB	00h	
54	DR7	DIF (Date Max. Value; Type G)	12h	
55	DR7	VIF (Date)	6Ch	
56	DR7	Value	xxh	
57	DR7	Value	xxh	
58	DR8	DIF (32 bit Int, Max. Value)	14h	
59	DR8	VIF (Flow Rate l/h)	3Bh	
60	DR8	Value	xxh	
61	DR8	Value	xxh	
62	DR8	Value	xxh	
63	DR8	Value	xxh	
64	DR9	DIF (32 Bit Int)	04h	
65	DR9	VIF (Flow Rate l/h)	3Bh	

66	DR9	Value	xxh
67	DR9	Value	xxh
68	DR9	Value	xxh
69	DR9	Value	xxh
70	DR10	DIF (Backflow Alarm Date; Type F)	C4h
71	DR10	DIFE (Storage No. 7)	03h
72	DR10	VIF (Date, Time)	6Dh
73	DR10	Value LSB	xxh
74	DR10	Value	xxh
75	DR10	Value	xxh
76	DR10	Value MSB	xxh
77	DR11	DIF (Manipulation Alarm Date; Type F)	84h
78	DR11	DIFE (Storage No. 6)	03h
79	DR11	VIF (Date, Time)	6Dh
80	DR11	Value LSB	xxh
81	DR11	Value	xxh
82	DR11	Value	xxh
83	DR11	Value MSB	xxh
84	DR12	DIF (2 digit BCD + Extension)	89h
85	DR12	DIFE (Storagenumber 8)	04h
86	DR12	VIF (Second Extensio table)	FDh
87	DR12	VIFE (Size of storage block)	22h
88	DR12	Value (13)	13h
89	DR13	DIF (2 digit BCD + Extension)	89h
90	DR13	DIFE (Storagenumber 8)	04h
91	DR13	VIF (Second Extensio table)	FDh
92	DR13	VIFE (Storage interval month)	28h
93	DR13	Value (1)	01h
94	DR14	DIF (16 bit Int. + Ext.)	82h
95	DR14	DIFE (Storagenumber 20)	0Ah
96	DR14	VIF (Date Type G)	6Ch
97	DR14	Value LSB	xxh
98	DR14	Value MSB	xxh
99	DR15	DIF (8 digit INT + Ext.)	84h
100	DR15	DIFE (Storagenumber 8)	04h
101	DR15	VIF (Volume l)	13h
102	DR15	Value LSB	xxh
103	DR15	Value	xxh
104	DR15	Value	xxh
105	DR15	Value MSB	xxh
106	DR16	DIF (8 digit INT + Ext.)	C4h
107	DR16	DIFE (Storagenumber 9)	04h
108	DR16	VIF (Volume l)	13h
109	DR16	Value LSB	xxh
110	DR16	Value	xxh
111	DR16	Value	xxh

112	DR16	Value MSB	xxh
113	DR17	DIF (8 digit INT + Ext.)	84h
114	DR17	DIFE (Storagenumber 10)	05h
115	DR17	VIF (Volume l)	13h
116	DR17	Value LSB	xxh
117	DR17	Value	xxh
118	DR17	Value	xxh
119	DR17	Value MSB	xxh
120	DR18	DIF (8 digit INT + Ext.)	C4h
121	DR18	DIFE (Storagenumber 11)	05h
122	DR18	VIF (Volume l)	13h
123	DR18	Value LSB	xxh
124	DR18	Value	xxh
125	DR18	Value	xxh
126	DR18	Value MSB	xxh
127	DR19	DIF (8 digit INT + Ext.)	84h
128	DR19	DIFE (Storagenumber 12)	06h
129	DR19	VIF (Volume l)	13h
130	DR19	Value LSB	xxh
131	DR19	Value	xxh
132	DR19	Value	xxh
133	DR19	Value MSB	xxh
134	DR20	DIF (8 digit INT + Ext.)	C4h
135	DR20	DIFE (Storagenumber 13)	06h
136	DR20	VIF (Volume l)	13h
137	DR20	Value LSB	xxh
138	DR20	Value	xxh
139	DR20	Value	xxh
140	DR20	Value MSB	xxh
141	DR21	DIF (8 digit INT + Ext.)	84h
142	DR21	DIFE (Storagenumber 14)	07h
143	DR21	VIF (Volume l)	13h
144	DR21	Value LSB	xxh
145	DR21	Value	xxh
146	DR21	Value	xxh
147	DR21	Value MSB	xxh
148	DR22	DIF (8 digit INT + Ext.)	C4h
149	DR22	DIFE (Storagenumber 15)	07h
150	DR22	VIF (Volume l)	13h
151	DR22	Value LSB	xxh
152	DR22	Value	xxh
153	DR22	Value	xxh
154	DR22	Value MSB	xxh
155	DR23	DIF (8 digit INT + Ext.)	84h
156	DR23	DIFE (Storagenumber 16)	08h
157	DR23	VIF (Volume l)	13h

158	DR23	Value LSB	xxh	
159	DR23	Value	xxh	
160	DR23	Value	xxh	
161	DR23	Value MSB	xxh	
162	DR24	DIF (8 digit INT + Ext.)	C4h	
163	DR24	DIFE (Storagenumber 17)	08h	
164	DR24	VIF (Volume l)	13h	
165	DR24	Value LSB	xxh	
166	DR24	Value	xxh	
167	DR24	Value	xxh	
168	DR24	Value MSB	xxh	
169	DR25	DIF (8 digit INT + Ext.)	84h	
170	DR25	DIFE (Storagenumber 18)	09h	
171	DR25	VIF (Volume l)	13h	
172	DR25	Value LSB	xxh	
173	DR25	Value	xxh	
174	DR25	Value	xxh	
175	DR25	Value MSB	xxh	
176	DR26	DIF (8 digit INT + Ext.)	C4h	
177	DR26	DIFE (Storagenumber 19)	09h	
178	DR26	VIF (Volume l)	13h	
179	DR26	Value LSB	xxh	
180	DR26	Value	xxh	
181	DR26	Value	xxh	
182	DR26	Value MSB	xxh	
183	DR27	DIF (8 digit INT + Ext.)	84h	
184	DR27	DIFE (Storagenumber 20)	0Ah	
185	DR27	VIF (Volume l)	13h	
186	DR27	Value LSB	xxh	
187	DR27	Value	xxh	
188	DR27	Value	xxh	
189	DR27	Value MSB	xxh	
190	DR28	DIF (Manufacturerspecific + Frame)	1Fh	
191	DR28	PBIT	xxh	
192	Checksum		xxh	DLL
193	Stop	Stop byte	16h	

Frame 2:

RSP-UD (M-Bus)

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Respond user data	08h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	72h (long header)	72h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	xxh	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	
19	Config Field	no Encryption	00h	
20	DR29	DIF (16 bit Int. + max Val. + Extension)	92h	Application Layer (APL)
21	DR29	DIFE (Storagenumber 28)	0Eh	
22	DR29	VIF (Date Type G)	6Ch	
23	DR29	Value	xxh	
24	DR29	Value	xxh	
25	DR30	DIF (32 bit Int. + max Val. + Extension)	94h	
26	DR30	DIFE (Storagenumber 28)	0Eh	
27	DR30	VIF (Volume flow [l/h])	3Bh	
28	DR30	Value	xxh	
29	DR30	Value	xxh	
30	DR30	Value	xxh	
31	DR30	Value	xxh	
32	DR31	DIF (16 bit Int. + max Val. + Extension)	D2h	
33	DR31	DIFE (Storagenumber 29)	0Eh	
34	DR31	VIF (Date Type G)	6Ch	
35	DR31	Value	xxh	
36	DR31	Value	xxh	
37	DR32	DIF (32 bit Int. + max Val. + Extension)	D4h	
38	DR32	DIFE (Storagenumber 29)	0Eh	

39	DR32	VIF (Volume flow [l/h])	3Bh
40	DR32	Value	xxh
41	DR32	Value	xxh
42	DR32	Value	xxh
43	DR32	Value	xxh
44	DR33	DIF (16 bit Int. + max Val. + Extension)	92h
45	DR33	DIFE (Storagenumber 30)	0Fh
46	DR33	VIF (Date Type G)	6Ch
47	DR33	Value	xxh
48	DR33	Value	xxh
49	DR34	DIF (32 bit Int. + max Val. + Extension)	94h
50	DR34	DIFE (Storagenumber 30)	0Fh
51	DR34	VIF (Volume flow [l/h])	3Bh
52	DR34	Value	xxh
53	DR34	Value	xxh
54	DR34	Value	xxh
55	DR34	Value	xxh
56	DR35	DIF (16 bit Int. + max Val. + Extension)	D2h
57	DR35	DIFE (Storagenumber 31)	0Fh
58	DR35	VIF (Date Type G)	6Ch
59	DR35	Value	xxh
60	DR35	Value	xxh
61	DR36	DIF (32 bit Int. + max Val. + Extension)	D4h
62	DR36	DIFE (Storagenumber 31)	0Fh
63	DR36	VIF (Volume flow [l/h])	3Bh
64	DR36	Value	xxh
65	DR36	Value	xxh
66	DR36	Value	xxh
67	DR36	Value	xxh
68	DR37	DIF (16 bit Int. + max Val. + Extension)	92h
69	DR37	DIFE (Extension)	80h
70	DR37	DIFE (Storagenumber 32)	01h
71	DR37	VIF (Date Type G)	6Ch
72	DR37	Value	xxh
73	DR37	Value	xxh
74	DR38	DIF (32 bit Int. + max Val. + Extension)	94h
75	DR38	DIFE (Extension)	80h
76	DR38	DIFE (Storagenumber 32)	01h
77	DR38	VIF (Volume flow [l/h])	3Bh
78	DR38	Value	xxh
79	DR38	Value	xxh
80	DR38	Value	xxh
81	DR38	Value	xxh
82	DR39	DIF (16 bit Int. + max Val. + Extension)	D2h
83	DR39	DIFE (Extension)	80h
84	DR39	DIFE (Storagenumber 33)	01h
85	DR39	VIF (Date Type G)	6Ch

86	DR39	Value	xxh
87	DR39	Value	xxh
88	DR40	DIF (32 bit Int. + max Val. + Extension)	D4h
89	DR40	DIFE (Extension)	80h
90	DR40	DIFE (Storagenumber 33)	01h
91	DR40	VIF (Volume flow [l/h])	3Bh
92	DR40	Value	xxh
93	DR40	Value	xxh
94	DR40	Value	xxh
95	DR40	Value	xxh
96	DR41	DIF (16 bit Int. + max Val. + Extension)	92h
97	DR41	DIFE (Extension)	81h
98	DR41	DIFE (Storagenumber 34)	01h
99	DR41	VIF (Date Type G)	6Ch
100	DR41	Value	xxh
101	DR41	Value	xxh
102	DR42	DIF (32 bit Int. + max Val. + Extension)	94h
103	DR42	DIFE (Extension)	81h
104	DR42	DIFE (Storagenumber 34)	01h
105	DR42	VIF (Volume flow [l/h])	3Bh
106	DR42	Value	xxh
107	DR42	Value	xxh
108	DR42	Value	xxh
109	DR42	Value	xxh
110	DR43	DIF (16 bit Int. + max Val. + Extension)	D2h
111	DR43	DIFE (Extension)	81h
112	DR43	DIFE (Storagenumber 35)	01h
113	DR43	VIF (Date Type G)	6Ch
114	DR43	Value	xxh
115	DR43	Value	xxh
116	DR44	DIF (32 bit Int. + max Val. + Extension)	D4h
117	DR44	DIFE (Extension)	81h
118	DR44	DIFE (Storagenumber 35)	01h
119	DR44	VIF (Volume flow [l/h])	3Bh
120	DR44	Value	xxh
121	DR44	Value	xxh
122	DR44	Value	xxh
123	DR44	Value	xxh
124	DR45	DIF (16 bit Int. + max Val. + Extension)	92h
125	DR45	DIFE (Extension)	82h
126	DR45	DIFE (Storagenumber 36)	01h
127	DR45	VIF (Date Type G)	6Ch
128	DR45	Value	xxh
129	DR45	Value	xxh
130	DR46	DIF (32 bit Int. + max Val. + Extension)	94h
131	DR46	DIFE (Extension)	82h

132	DR46	DIFE (Storagenumber 36)	01h
133	DR46	VIF (Volume flow [l/h])	3Bh
134	DR46	Value	xxh
135	DR46	Value	xxh
136	DR46	Value	xxh
137	DR46	Value	xxh
138	DR47	DIF (16 bit Int. + max Val. + Extension)	D2h
139	DR47	DIFE (Extension)	82h
140	DR47	DIFE (Storagenumber 37)	01h
141	DR47	VIF (Date Type G)	6Ch
142	DR47	Value	xxh
143	DR47	Value	xxh
144	DR48	DIF (32 bit Int. + max Val. + Extension)	D4h
145	DR48	DIFE (Extension)	82h
146	DR48	DIFE (Storagenumber 37)	01h
147	DR48	VIF (Volume flow [l/h])	3Bh
148	DR48	Value	xxh
149	DR48	Value	xxh
150	DR48	Value	xxh
151	DR48	Value	xxh
152	DR49	DIF (16 bit Int. + max Val. + Extension)	92h
153	DR49	DIFE (Extension)	83h
154	DR49	DIFE (Storagenumber 38)	01h
155	DR49	VIF (Date Type G)	6Ch
156	DR49	Value	xxh
157	DR49	Value	xxh
158	DR50	DIF (32 bit Int. + max Val. + Extension)	94h
159	DR50	DIFE (Extension)	83h
160	DR50	DIFE (Storagenumber 38)	01h
161	DR50	VIF (Volume flow [l/h])	3Bh
162	DR50	Value	xxh
163	DR50	Value	xxh
164	DR50	Value	xxh
165	DR50	Value	xxh
166	DR51	DIF (16 bit Int. + max Val. + Extension)	D2h
167	DR51	DIFE (Extension)	83h
168	DR51	DIFE (Storagenumber 39)	01h
169	DR51	VIF (Date Type G)	6Ch
170	DR51	Value	xxh
171	DR51	Value	xxh
172	DR52	DIF (32 bit Int. + max Val. + Extension)	D4h
173	DR52	DIFE (Extension)	83h
174	DR52	DIFE (Storagenumber 39)	01h
175	DR52	VIF (Volume flow [l/h])	3Bh
176	DR52	Value	xxh
177	DR52	Value	xxh

178	DR52	Value	xxh	
179	DR52	Value	xxh	
180	DR53	DIF (16 bit Int. + max Val. + Extension)	92h	
181	DR53	DIFE (Extension)	80h	
182	DR53	DIFE (Storagenumber 40)	01h	
183	DR53	VIF (Date Type G)	6Ch	
184	DR53	Value	xxh	
185	DR53	Value	xxh	
186	DR54	DIF (32 bit Int. + max Val. + Extension)	94h	
187	DR54	DIFE (Extension)	80h	
188	DR54	DIFE (Storagenumber 40)	01h	
189	DR54	VIF (Volume flow [l/h])	3Bh	
190	DR54	Value	xxh	
191	DR54	Value	xxh	
192	DR54	Value	xxh	
193	DR54	Value	xxh	
194	Checksum		xxh	DLL
195	Stop	Stop byte	16h	

4.2.3 Short – telegram for meters 150mm – 300mm (only Firmware 3 and newer)

The used VIF resolution for consumption and flow rate values is in 0.01 m³(/h) → 10 litres (/h) accuracy

RSP-UD (M-Bus)

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Respond user data	08h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	72h (long header)	72h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	xxh	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	
19	Config Field	no Encryption	00h	
20	DR1	DIF (8 digit INT)	04h	Application Layer (APL)
21	DR1	VIF (Volume x10 l)	14h	
22	DR1	Value LSB	A7h	
23	DR1	Value	02h	
24	DR1	Value (= 6.79 m³)	00h	
25	DR1	Value MSB	00h	
26	DR2	DIF (Time at readout; Type F)	04h	
27	DR2	VIF (Date, Time)	6Dh	
28	DR2	Value LSB	29h	
29	DR2	Value	14h	
30	DR2	Value (27.02.00 20:41)	1Bh	
31	DR2	Value MSB	02h	
32	DR3	DIF (Date Stor. 1;Type G)	42h	
33	DR3	VIF (Date)	6Ch	
34	DR3	Value	xxh	

35	DR3	Value	xxh
36	DR4	DIF (8 digit INT Stor. 1)	44h
37	DR4	VIF (Volume x10 l)	14h
38	DR4	Value LSB	00h
39	DR4	Value	00h
40	DR4	Value (= 0.00 m³)	00h
41	DR4	Value MSB	00h
42	DR5	DIF (Date Stor. 1;Type G)	42h
43	DR5	VIF (Date + Extension)	ECh
44	DR5	VIFE (Future Value)	7Eh
45	DR5	Value	A1h
46	DR5	Value (01.01.21)	21h
47	DR6	DIF (8 digit INT)	04h
48	DR6	VIF (Volume x10 l + Extension)	94h
49	DR6	VIFE (backward flow)	3Ch
50	DR6	Value LSB	67h
51	DR6	Value	09h
52	DR6	Value (= 24.07 m³)	00h
53	DR6	Value MSB	00h
54	DR7	DIF (Date Max. Value; Type G)	12h
55	DR7	VIF (Date)	6Ch
56	DR7	Value	08h
57	DR7	Value (08.02.00)	02h
58	DR8	DIF (32 bit Int, Max. Value)	14h
59	DR8	VIF (Flow Rate x10 l/h)	3Ch
60	DR8	Value	00h
61	DR8	Value	00h
62	DR8	Value (0 l/h)	00h
63	DR8	Value	00h
64	DR9	DIF (32 Bit Int)	04h
65	DR9	VIF (Flow Rate x10 l/h)	3Ch
66	DR9	Value	00h
67	DR9	Value	00h
68	DR9	Value (0 l/h)	00h
69	DR9	Value	00h
70	DR10	DIF (Backflow Alarm Date; Type F)	C4h
71	DR10	DIFE (Storage No. 7)	03h
72	DR10	VIF (Date, Time)	6Dh
73	DR10	Value LSB	00h
74	DR10	Value	00h
75	DR10	Value (00.00.00 --> no historic alarm)	00h
76	DR10	Value MSB	00h
77	DR11	DIF (Manipulation Alarm Date; Type F)	84h
78	DR11	DIFE (Storage No. 6)	03h
79	DR11	VIF (Date, Time)	6Dh
80	DR11	Value LSB	00h

81	DR11	Value	00h	
82	DR11	Value (00.00.00 --> no historic alarm)	00h	
83	DR11	Value MSB	00h	
84	DR12	DIF (Manufacturerspecific)	0Fh	
85	DR12	PBIT	xxh	
86	Checksum		xxh	DLL
87	Stop	Stop byte	16h	

4.2.4 Long – telegram for meters 150mm – 300mm (only Firmware 3 and newer)

Long telegram with monthly values.
The used VIF resolution for consumption and flow rate values is in 0.01 m³(/h) → 10 litres (/h) accuracy

Frame 1:

RSP-UD (M-Bus)

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Respond user data	08h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	72h (long header)	72h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	xxh	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	
19	Config Field	no Encryption	00h	
20	DR1	DIF (8 digit INT)	04h	Application Layer (APL)
21	DR1	VIF (Volume x10 l)	14h	
22	DR1	Value LSB	A7h	
23	DR1	Value	02h	
24	DR1	Value (= 6.79 m³)	00h	
25	DR1	Value MSB	00h	
26	DR2	DIF (Time at readout; Type F)	04h	
27	DR2	VIF (Date, Time)	6Dh	
28	DR2	Value LSB	32h	

29	DR2	Value	37h
30	DR2	Value (31.05.2008 23:50)	1Fh
31	DR2	Value MSB	15h
32	DR3	DIF (Date Stor. 1;Type G)	42h
33	DR3	VIF (Date)	6Ch
34	DR3	Value	xxh
35	DR3	Value	xxh
36	DR4	DIF (8 digit INT Stor. 1)	44h
37	DR4	VIF (Volume x10 l)	14h
38	DR4	Value LSB	00h
39	DR4	Value	00h
40	DR4	Value (= 0.00 m^3)	00h
41	DR4	Value MSB	00h
42	DR5	DIF (Date Stor. 1;Type G)	42h
43	DR5	VIF (Date + Extension)	ECh
44	DR5	VIFE (Future Value)	7Eh
45	DR5	Value	xxh
46	DR5	Value	xxh
47	DR6	DIF (8 digit INT)	04h
48	DR6	VIF (Volume x10 l + Extension)	94h
49	DR6	VIFE (backward flow)	3Ch
50	DR6	Value LSB	67h
51	DR6	Value	09h
52	DR6	Value (= 24.07 m^3)	00h
53	DR6	Value MSB	00h
54	DR7	DIF (Date Max. Value; Type G)	12h
55	DR7	VIF (Date)	6Ch
56	DR7	Value	xxh
57	DR7	Value	xxh
58	DR8	DIF (32 bit Int, Max. Value)	14h
59	DR8	VIF (Flow Rate x10 l/h)	3Ch
60	DR8	Value	xxh
61	DR8	Value	xxh
62	DR8	Value	xxh
63	DR8	Value	xxh
64	DR9	DIF (32 Bit Int)	04h
65	DR9	VIF (Flow Rate x10 l/h)	3Ch
66	DR9	Value	xxh
67	DR9	Value	xxh
68	DR9	Value	xxh
69	DR9	Value	xxh
70	DR10	DIF (Backflow Alarm Date; Type F)	C4h
71	DR10	DIFE (Storage No. 7)	03h
72	DR10	VIF (Date, Time)	6Dh
73	DR10	Value LSB	xxh
74	DR10	Value	xxh
75	DR10	Value	xxh

76	DR10	Value MSB	xxh
77	DR11	DIF (Manipulation Alarm Date; Type F)	84h
78	DR11	DIFE (Storage No. 6)	03h
79	DR11	VIF (Date, Time)	6Dh
80	DR11	Value LSB	xxh
81	DR11	Value	xxh
82	DR11	Value	xxh
83	DR11	Value MSB	xxh
84	DR12	DIF (2 digit BCD + Extension)	89h
85	DR12	DIFE (Storagenumber 8)	04h
86	DR12	VIF (Second Extensio table)	FDh
87	DR12	VIFE (Size of storage block)	22h
88	DR12	Value (13)	13h
89	DR13	DIF (2 digit BCD + Extension)	89h
90	DR13	DIFE (Storagenumber 8)	04h
91	DR13	VIF (Second Extensio table)	FDh
92	DR13	VIFE (Storage interval month)	28h
93	DR13	Value (1)	01h
94	DR14	DIF (16 bit Int. + Ext.)	82h
95	DR14	DIFE (Storagenumber 20)	0Ah
96	DR14	VIF (Date Type G)	6Ch
97	DR14	Value LSB	xxh
98	DR14	Value MSB	xxh
99	DR15	DIF (8 digit INT + Ext.)	84h
100	DR15	DIFE (Storagenumber 8)	04h
101	DR15	VIF (Volume x10 l)	14h
102	DR15	Value LSB	xxh
103	DR15	Value	xxh
104	DR15	Value	xxh
105	DR15	Value MSB	xxh
106	DR16	DIF (8 digit INT + Ext.)	C4h
107	DR16	DIFE (Storagenumber 9)	04h
108	DR16	VIF (Volume x10 l)	14h
109	DR16	Value LSB	xxh
110	DR16	Value	xxh
111	DR16	Value	xxh
112	DR16	Value MSB	xxh
113	DR17	DIF (8 digit INT + Ext.)	84h
114	DR17	DIFE (Storagenumber 10)	05h
115	DR17	VIF (Volume x10 l)	14h
116	DR17	Value LSB	xxh
117	DR17	Value	xxh
118	DR17	Value	xxh
119	DR17	Value MSB	xxh
120	DR18	DIF (8 digit INT + Ext.)	C4h
121	DR18	DIFE (Storagenumber 11)	05h

122	DR18	VIF (Volume x10 l)	14h
123	DR18	Value LSB	xxh
124	DR18	Value	xxh
125	DR18	Value	xxh
126	DR18	Value MSB	xxh
127	DR19	DIF (8 digit INT + Ext.)	84h
128	DR19	DIFE (Storagenumber 12)	06h
129	DR19	VIF (Volume x10 l)	14h
130	DR19	Value LSB	xxh
131	DR19	Value	xxh
132	DR19	Value	xxh
133	DR19	Value MSB	xxh
134	DR20	DIF (8 digit INT + Ext.)	C4h
135	DR20	DIFE (Storagenumber 13)	06h
136	DR20	VIF (Volume x10 l)	14h
137	DR20	Value LSB	xxh
138	DR20	Value	xxh
139	DR20	Value	xxh
140	DR20	Value MSB	xxh
141	DR21	DIF (8 digit INT + Ext.)	84h
142	DR21	DIFE (Storagenumber 14)	07h
143	DR21	VIF (Volume x10 l)	14h
144	DR21	Value LSB	xxh
145	DR21	Value	xxh
146	DR21	Value	xxh
147	DR21	Value MSB	xxh
148	DR22	DIF (8 digit INT + Ext.)	C4h
149	DR22	DIFE (Storagenumber 15)	07h
150	DR22	VIF (Volume x10 l)	14h
151	DR22	Value LSB	xxh
152	DR22	Value	xxh
153	DR22	Value	xxh
154	DR22	Value MSB	xxh
155	DR23	DIF (8 digit INT + Ext.)	84h
156	DR23	DIFE (Storagenumber 16)	08h
157	DR23	VIF (Volume x10 l)	14h
158	DR23	Value LSB	xxh
159	DR23	Value	xxh
160	DR23	Value	xxh
161	DR23	Value MSB	xxh
162	DR24	DIF (8 digit INT + Ext.)	C4h
163	DR24	DIFE (Storagenumber 17)	08h
164	DR24	VIF (Volume x10 l)	14h
165	DR24	Value LSB	xxh
166	DR24	Value	xxh
167	DR24	Value	xxh

168	DR24	Value MSB	xxh	
169	DR25	DIF (8 digit INT + Ext.)	84h	
170	DR25	DIFE (Storagenumber 18)	09h	
171	DR25	VIF (Volume x10 l)	14h	
172	DR25	Value LSB	xxh	
173	DR25	Value	xxh	
174	DR25	Value	xxh	
175	DR25	Value MSB	xxh	
176	DR26	DIF (8 digit INT + Ext.)	C4h	
177	DR26	DIFE (Storagenumber 19)	09h	
178	DR26	VIF (Volume x10 l)	14h	
179	DR26	Value LSB	xxh	
180	DR26	Value	xxh	
181	DR26	Value	xxh	
182	DR26	Value MSB	xxh	
183	DR27	DIF (8 digit INT + Ext.)	84h	
184	DR27	DIFE (Storagenumber 20)	0Ah	
185	DR27	VIF (Volume x10 l)	14h	
186	DR27	Value LSB	xxh	
187	DR27	Value	xxh	
188	DR27	Value	xxh	
189	DR27	Value MSB	xxh	
190	DR28	DIF (Manufacturerspecific + Frame)	1Fh	
191	DR28	PBIT	xxh	
192	Checksum		xxh	DLL
193	Stop	Stop byte	16h	

Frame 2:

RSP-UD (M-Bus)

Byte No		OMS M-Bus frame	Water meter example	Layer
	Field Name	Content	Bytes [hex]	
			plain	
1	Start	Start byte	68h	Data Link Layer (DLL)
2	L Field	Length of data (xx bytes)	xxh	
3	L Field	Length of data (xx bytes)	xxh	
4	Start	Start byte	68h	
5	C Field	Respond user data	08h	
6	A-Field	Secondary addressing mode	FDh	
7	CI Field	72h (long header)	72h	Transport Layer (TPL)
8	Ident.Nr.	Ident No LSB (BCD)	78h	
9	Ident.Nr.	Ident No (BCD)	56h	
10	Ident.Nr.	Ident No (BCD) (=12345678)	34h	
11	Ident.Nr.	Ident No MSB (BCD)	12h	
12	Manufr	Manufacturer code	92h	
13	Manufr	Manufacturer code	15h	
14	Version	Version (or Generation number)	xxh	
15	Device type	Device type (Medium=Water)	07h	
16	Access No.	Access number of Meter	2Ah	
17	Status	M-Bus state	00h	
18	Config Field	no Encryption	00h	
19	Config Field	no Encryption	00h	
20	DR29	DIF (16 bit Int. + max Val. + Extension)	92h	Application Layer (APL)
21	DR29	DIFE (Storagenumber 28)	0Eh	
22	DR29	VIF (Date Type G)	6Ch	
23	DR29	Value	xxh	
24	DR29	Value	xxh	
25	DR30	DIF (32 bit Int. + max Val. + Extension)	94h	
26	DR30	DIFE (Storagenumber 28)	0Eh	
27	DR30	VIF (Flow Rate x10 l/h)	3Ch	
28	DR30	Value	xxh	
29	DR30	Value	xxh	
30	DR30	Value	xxh	
31	DR30	Value	xxh	
32	DR31	DIF (16 bit Int. + max Val. + Extension)	D2h	
33	DR31	DIFE (Storagenumber 29)	0Eh	
34	DR31	VIF (Date Type G)	6Ch	
35	DR31	Value	xxh	
36	DR31	Value	xxh	
37	DR32	DIF (32 bit Int. + max Val. + Extension)	D4h	
38	DR32	DIFE (Storagenumber 29)	0Eh	

39	DR32	VIF (Flow Rate x10 l/h)	3Ch
40	DR32	Value	xxh
41	DR32	Value	xxh
42	DR32	Value	xxh
43	DR32	Value	xxh
44	DR33	DIF (16 bit Int. + max Val. + Extension)	92h
45	DR33	DIFE (Storagenumber 30)	0Fh
46	DR33	VIF (Date Type G)	6Ch
47	DR33	Value	xxh
48	DR33	Value	xxh
49	DR34	DIF (32 bit Int. + max Val. + Extension)	94h
50	DR34	DIFE (Storagenumber 30)	0Fh
51	DR34	VIF (Flow Rate x10 l/h)	3Ch
52	DR34	Value	xxh
53	DR34	Value	xxh
54	DR34	Value	xxh
55	DR34	Value	xxh
56	DR35	DIF (16 bit Int. + max Val. + Extension)	D2h
57	DR35	DIFE (Storagenumber 31)	0Fh
58	DR35	VIF (Date Type G)	6Ch
59	DR35	Value	xxh
60	DR35	Value	xxh
61	DR36	DIF (32 bit Int. + max Val. + Extension)	D4h
62	DR36	DIFE (Storagenumber 31)	0Fh
63	DR36	VIF (Flow Rate x10 l/h)	3Ch
64	DR36	Value	xxh
65	DR36	Value	xxh
66	DR36	Value	xxh
67	DR36	Value	xxh
68	DR37	DIF (16 bit Int. + max Val. + Extension)	92h
69	DR37	DIFE (Extension)	80h
70	DR37	DIFE (Storagenumber 32)	01h
71	DR37	VIF (Date Type G)	6Ch
72	DR37	Value	xxh
73	DR37	Value	xxh
74	DR38	DIF (32 bit Int. + max Val. + Extension)	94h
75	DR38	DIFE (Extension)	80h
76	DR38	DIFE (Storagenumber 32)	01h
77	DR38	VIF (Flow Rate x10 l/h)	3Ch
78	DR38	Value	xxh
79	DR38	Value	xxh
80	DR38	Value	xxh
81	DR38	Value	xxh
82	DR39	DIF (16 bit Int. + max Val. + Extension)	D2h
83	DR39	DIFE (Extension)	80h
84	DR39	DIFE (Storagenumber 33)	01h
85	DR39	VIF (Date Type G)	6Ch

86	DR39	Value	xxh
87	DR39	Value	xxh
88	DR40	DIF (32 bit Int. + max Val. + Extension)	D4h
89	DR40	DIFE (Extension)	80h
90	DR40	DIFE (Storagenumber 33)	01h
91	DR40	VIF (Flow Rate x10 l/h)	3Ch
92	DR40	Value	xxh
93	DR40	Value	xxh
94	DR40	Value	xxh
95	DR40	Value	xxh
96	DR41	DIF (16 bit Int. + max Val. + Extension)	92h
97	DR41	DIFE (Extension)	81h
98	DR41	DIFE (Storagenumber 34)	01h
99	DR41	VIF (Date Type G)	6Ch
100	DR41	Value	xxh
101	DR41	Value	xxh
102	DR42	DIF (32 bit Int. + max Val. + Extension)	94h
103	DR42	DIFE (Extension)	81h
104	DR42	DIFE (Storagenumber 34)	01h
105	DR42	VIF (Flow Rate x10 l/h)	3Ch
106	DR42	Value	xxh
107	DR42	Value	xxh
108	DR42	Value	xxh
109	DR42	Value	xxh
110	DR43	DIF (16 bit Int. + max Val. + Extension)	D2h
111	DR43	DIFE (Extension)	81h
112	DR43	DIFE (Storagenumber 35)	01h
113	DR43	VIF (Date Type G)	6Ch
114	DR43	Value	xxh
115	DR43	Value	xxh
116	DR44	DIF (32 bit Int. + max Val. + Extension)	D4h
117	DR44	DIFE (Extension)	81h
118	DR44	DIFE (Storagenumber 35)	01h
119	DR44	VIF (Flow Rate x10 l/h)	3Ch
120	DR44	Value	xxh
121	DR44	Value	xxh
122	DR44	Value	xxh
123	DR44	Value	xxh
124	DR45	DIF (16 bit Int. + max Val. + Extension)	92h
125	DR45	DIFE (Extension)	82h
126	DR45	DIFE (Storagenumber 36)	01h
127	DR45	VIF (Date Type G)	6Ch
128	DR45	Value	xxh
129	DR45	Value	xxh
130	DR46	DIF (32 bit Int. + max Val. + Extension)	94h
131	DR46	DIFE (Extension)	82h

132	DR46	DIFE (Storagenumber 36)	01h
133	DR46	VIF (Flow Rate x10 l/h)	3Ch
134	DR46	Value	xxh
135	DR46	Value	xxh
136	DR46	Value	xxh
137	DR46	Value	xxh
138	DR47	DIF (16 bit Int. + max Val. + Extension)	D2h
139	DR47	DIFE (Extension)	82h
140	DR47	DIFE (Storagenumber 37)	01h
141	DR47	VIF (Date Type G)	6Ch
142	DR47	Value	xxh
143	DR47	Value	xxh
144	DR48	DIF (32 bit Int. + max Val. + Extension)	D4h
145	DR48	DIFE (Extension)	82h
146	DR48	DIFE (Storagenumber 37)	01h
147	DR48	VIF (Flow Rate x10 l/h)	3Ch
148	DR48	Value	xxh
149	DR48	Value	xxh
150	DR48	Value	xxh
151	DR48	Value	xxh
152	DR49	DIF (16 bit Int. + max Val. + Extension)	92h
153	DR49	DIFE (Extension)	83h
154	DR49	DIFE (Storagenumber 38)	01h
155	DR49	VIF (Date Type G)	6Ch
156	DR49	Value	xxh
157	DR49	Value	xxh
158	DR50	DIF (32 bit Int. + max Val. + Extension)	94h
159	DR50	DIFE (Extension)	83h
160	DR50	DIFE (Storagenumber 38)	01h
161	DR50	VIF (Flow Rate x10 l/h)	3Ch
162	DR50	Value	xxh
163	DR50	Value	xxh
164	DR50	Value	xxh
165	DR50	Value	xxh
166	DR51	DIF (16 bit Int. + max Val. + Extension)	D2h
167	DR51	DIFE (Extension)	83h
168	DR51	DIFE (Storagenumber 39)	01h
169	DR51	VIF (Date Type G)	6Ch
170	DR51	Value	xxh
171	DR51	Value	xxh
172	DR52	DIF (32 bit Int. + max Val. + Extension)	D4h
173	DR52	DIFE (Extension)	83h
174	DR52	DIFE (Storagenumber 39)	01h
175	DR52	VIF (Flow Rate x10 l/h)	3Ch
176	DR52	Value	xxh
177	DR52	Value	xxh

178	DR52	Value	xxh	
179	DR52	Value	xxh	
180	DR53	DIF (16 bit Int. + max Val. + Extension)	92h	
181	DR53	DIFE (Extension)	80h	
182	DR53	DIFE (Storagenumber 40)	01h	
183	DR53	VIF (Date Type G)	6Ch	
184	DR53	Value	xxh	
185	DR53	Value	xxh	
186	DR54	DIF (32 bit Int. + max Val. + Extension)	94h	
187	DR54	DIFE (Extension)	80h	
188	DR54	DIFE (Storagenumber 40)	01h	
189	DR54	VIF (Flow Rate x10 l/h)	3Ch	
190	DR54	Value	xxh	
191	DR54	Value	xxh	
192	DR54	Value	xxh	
193	DR54	Value	xxh	
194	Checksum		xxh	DL L

4.3 M-Bus Status Byte use – Alarms

The M-Bus Status Byte used in the Transport Layer is acc. EN13757-7.
The bit layout for the Status Byte is:

Status Byte	7	6	5	4	3	2	1	0
	Backflow alarm	Manipulation alarm	Not used	Not used	Not used	Battery Low	Not used	Not used

The manipulation alarm can be a removal or a magnetic tamper alarm. In case of a removal alarm the PBIT bit

4.4 M-Bus Manufacturer specific PBIT data record

In the 1st frames, a manufacturer specific part is used which is called PBIT.
The DIF field is 0F if the short telegram is activated and it is 1F if the long telegram is activated
The bit layout for the PBIT Byte is:

PBIT Byte	7	6	5	4	3	2	1	0
	Write protection active	Removal alarm	Not used	Not used	Not used	Not used	Not used	Long telegram active

4.5 M-Bus Configuration telegram examples

The following telegrams are examples to write certain parameters to the module. All examples are based on a primary address communication using the primary address 254 (FEh).

Set meter index of 169420 litres (000295CCh):

6809096853FE510413**CC950200**1C16

Set Backflow index of 0 litres (00000000h):

680A0A6853FE5104933C**00000000**7516

Clear alarms (81h):

6804046853FE50**81**2216

Clear historic readings (80h):

6804046853FE50**80**2116

Select normal Read out (20h):

6804046853FE50**20**C116

Select all Read out (00h):

6804046853FE50**00**A116

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