Open Metering System
Conformance Test

Volume 4
Application layer

Issue 1.0.1 / 2012-10-15

Release

Document History

Version	Date	Comment	Editor
1.0.0	2011-10-11	Final version	J. Feuchtmeier
1.0.1	2012-10-15	Adoption of coding of data points	J.Feuchtmeier

Table of contents

List of Tables

1 Scope

This document describes the OMS conformance tests for basic meters with focus on the application layer.

This issue is applicable only together with [OMSCT-GEN].

It is split onto 2 parts, one covering CI fields and headers usage; the other concentrates on the MBus application layer.

Tests for physical and link layer are covered in the other volumes of the test specification.

2 References

The used references are defined in **[OMSCT-GEN]** (OMS Open Metering System – Conformance Test Volume 1 – General Part).

3 Definitions, symbols and abbreviations

The used term definitions, symbols and abbreviations are defined in [OMSCT-GEN].

.

Part 1:

Generic Application Header

4 Check of the fixed part of the application frame

The following fields shall be checked out of the application frame's fixed part.

4.1 [T41-CI1] CI-Field

The Application frame starts always with a CI-Field. The CI-Fields applied for OMS-communication are listed in [OMSS-Vol2] Table 5.

Test condition to be defined!

4.2 [T41-AD1] Address (8 Byte)

If the CI-Field has the type "long header" (APL header length of 12 or 14 byte) then the Address field is present and has to fulfil the limits of Table 1.

Byte 1..4	Ident number	BCD only (from 00000001d to 99999999d)
Byte 5..6	Manufacturer	Binary (binary coded 3-Letter Manufacture ID as listed by Flag association)*
Byte 7	Version	Binary (from 00h to FEh)
Byte 8	Device type	Binary (all values from [EN13757-3] Table 3 and [OMSS-Vol2] Table 6)

Table 1: Valid range for parts of meter address

* Manufacturer must be listed in [FLAG]. The three letters of Manufacturer ID can be derived by calculation given in [EN13757-3] clause 5.5.

4.3 [T41-AN1] Access Number (1 Byte)

If the CI-Field of telegram has the type "long header" (APL header length of 12 or 14 byte) or short header (APL header length of 4 or 6 byte) the field Access number is present and has to be tested.

[OMSS-Vol2] Clause 4.2.2 distinguishes between meter access number and MUC access number and defines which message type has to apply which type of Access number.

The meter access number may consist of every value between 0d and 255d. It is increased by 1 on each transmission containing new data.. In case of telegram repetition, the access number remains constant.

The MUC access number is generated by the MUC. It may consist of every value between 0d and 255d. It is incremented on each transmission to a single meter/actuator containing new data. Additional restriction applies as the MUC shall not reuse an access number for the same meter/ actuator within a period of 300 seconds.

4.4 [T41-ST1] Status (1 Byte)

If the CI-field of telegram has the type "long header" (APL header length of 12 or 14 byte) or short header (APL header length of 4 or 6 byte) the field Status is present and has to be tested.

[OMSS-Vol2] Clause 4.2.3 distinguishes between meter Status and MUC Status by CI-Field.

The meter Status byte shall be conform to [EN13757-3]. The bit "temporary error" is set only if the meter signals a minor error condition (does not requires a service action immeediately).

The bit “permanent error” is set only if the meter signals a fatal device error (requires a service action).

The bit “Power low” is set only to signal interruption of power supply or end of battery life (requires a service action).

The bit combination “any application error” shall be set if an application error happens after the reception of command (refer to [OMSS-Vol2] clause 4.2.3.2. The bit may also be set in meter initiated transmissions.

The manufacture specific bits may consist of any values.

The MUC-Status shall conform to table in [OMSS-Vol2] clause 4.2.3.1.

4.5 [T41-CW1] Configuration Word

If the CI-Field of telegram has the type “long header” (APL header length of 12 or 14 byte) or short header (APL header length of 4 or 6 byte), the Signature word is present and has to be tested.

The Signature or now called Configuration Word shall conform to [OMSS-Vol2] Table 10. The range of special bits listed in this table has to be fulfilling these limits:

Bit Name	Accepted range	Remarks
B/A	[OMSS-Vol2] Table 2	
MMMM	Value “0”, “4”[1)] and “5” only	
NNNN	As calculated in [OMSS-Vol2] clause 4.2.5.4	
CC	[OMSS-Vol2] Table 8 and Table 9	
HH	[OMSS-Vol2] Clause 3.2.3.1	
Reserved	Reserved bits has to be “0”	

Table 2: Valid range of bits in signature word respective configuration word

[1)] Signature method 4 describes the encryption according to Dutch Smart Meter Requirements. Conformance test has to be based on [DSMR P2] and is not scope of the OMS-CT.

4.6 Encryption/Decryption Test

4.6.1 [T41-E1] Encryption

Wireless meter/actuator shall support data encryption. Encryption is optional for wired meters only. The applied encryption mode and encryption key has to be listed in[OMSCT-ManDec]. The Encryption/Decryption test shall not be executed for Encryption mode “4”!

The encryption of a received telegram is tested by the OMS Conformance Test tool. The Encryption key has to be provided by the manufacture and applied by the OMS Conformance Test tool.

The meter shall send an encrypted telegram with a valid encryption method. (Encryption methods are listed in Table 2 “MMMM”).

The test passes, if at least two telegrams with Encryption method “5” could be decrypted, verified by AES check sequence “0x2F 0x2F”.

4.6.2 [T41-E2] Decryption

The decryption of a received telegram is tested by OMS Conformance Test tool. The Manufacture has to provide an unencrypted Command sequence e.g. “Switch Valve” and valid encryption key of the meter. The Command sequence and Encryption key has to be imported into the OMS-Test tool.

The OMS-Conformance Test tool request Standard data by REQ-UD2 (refer to [OMSS-Vol2] Table 3). When the meter responds the OMS Conformance test tool shall forward a simple Test-Command. An Acknowledge (ACK) has to be responded from meter.

The test has to be executed twice. The first time OMS Test tool send with unencrypted telegram to verify test procedure. (This test is not mandatory!) The second test will be applied with the encrypted command. (This test is mandatory!)

The test passes when meter executes the encrypted command (e.g. state of valve is changed).

5 Check of the variable part of the application frame

The CI field determines the used application protocol of the message. The available application protocols are shown in Table 3. The CI-Field shall be one out of the CI-Fields listed in [OMSS-Vol2] Table 5. If an application frame exists the type of Application protocol is declared in column “Application protocol” of this table. The test specification of the Application protocols are listed in Table 3.

Application protocol	Tested by
M-Bus	OMS-Conformance Test Volume 4 - Part 2 (this document)
DLMS	DLMS/COSEM - To be defined!
SML	To be defined!

Table 3: Table of possible application protocols

Part 2:

M-Bus Protocol

6 Check an M-Bus-Application frame

The M-Bus Application frame consists of one or several data records as chained M-Bus string. To verify every standardised data records the M-Bus String has to be separated into data records. The test tool for Conformance test shall parse the M-Bus-string as defined in next chapter.

6.1 [T42-P1] Parsing an M-Bus-String

The M-Bus string should always start with a valid DIF. The DIF describes the format and length of the contained data. Each data record needs to be evaluated to determine the length and thus the beginning of the next record. The length can be calculated as follows:

```
Length = Sum of all DIF/DIFE + Sum of all VIF/VIFE + Length of Data
```

The Number of DIF/DIFE-fields shall be calculated by summing up all octets until the Extension Bit is cleared.

The Number of VIF/VIFE-fields shall be calculated by summing up all octets until the Extension Bit is cleared.

The Length of data shall be calculated according to the predefined length as given in [EN13757-3] Table 6.

Exceptions have to be applied in case of data filed DIF=0xD (LVAR) and data field DIF=0xF (special functions)

In case of variable data length, an 8 bit length field can be found at the end of the VIF/VIFE sequence. The field indicated the length of the data following.

Using special functions all special DIF are allowed but the special DIF 0x2F may be supported only. After 2Fh follows no VIF and the Length of data is 0. For all other special functions the parsing should be stopped at this position. Alternative the special parser may also consider other special functions, if the interpretations rule is known.

Applying this rules the telegram can be separated in different data records before the interpretation of every data record is started.

EXAMPLE 1:

This example shows a M-Bus-string for an volume in gallons represented by a hexadecimal number.As gallons are not part of OBIS-Table, the OMS-Standard interpreter may ignore this data record and continues parsing with the next data record. The length of the ignored data record can by found as following:

```
0x CC 80 01 FB 23 78 56 34 12 0F 12 34 56 2F 2F
```

DIF, DIFE, VIF, VIFE, example 12345678

Length = 8 Digits BCD for Data (Type 1100b in Table 3) = 4 octets

+ DIF (set extension bit) and DIFE (set ext. bit) and DIFE (cleared ext. bit) = 3 octets

+ VIF (set extension bit) and VIFE (cleared extension bit) = 2 octets

Thus the next DIF (0x2F) follows after 9 octets!

EXAMPLE 2:

The example shows a complete application layer frame (hexadecimal numbers; without CRC). The parsing starts after the signature word by separating the individual data records.

```
0x 7A 02 04 00 00 2F 2F 0B 13 56 34 12 8B 82 00 93 3E 67 45 23 0D FD
0x 10 0A 30 31 32 33 34 35 36 37 38 39 0F 88 2F
```

-	7A 02 04 00 00	CI-Field 7Ah is followed by 4 Byte fix header
1	2F	First DIF Special function (1 DIF, 0 VIF, no data → L=1)
2	2F	Special function (1 DIF, 0 VIF, no data) → L=1
3	0B 13 56 34 12	Data record (1 DIF, 1 VIF, 3 Byte of data) → L=5
4	8B 82 00 93 3E 67 45 23	Data record (3 DIF/DIFE, 2 VIF/VIFE, 3 Byte of data) → L=8
5	0D FD 10 0A 30 31 32 33 34 35 36 37 38 39	LVAR (1 DIF, 2 VIF/VIFE, 1 Length-field (showing 10 (0Ah) remaining bytes) and 10 Byte ASCII) → L=14
?	0F 88 2F	Special function (manufacture specific) unknown Length → stop parsing here

6.2 [T42-GD1] Generic Data points

To be defined!

6.3 Electricity meters

6.3.1 [T42-EL1] Data point: Current consumption Value (meter count)

6.3.1.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 4: Electricity meter – DIF for meter count

Valid VIFs	Meaning
0x00	Energy [mWh]
0x01	Energy 10 [mWh]
0x02	Energy 100 [mWh]
0x03	Energy [Wh]
0x04	Energy 10 [Wh]
0x05	Energy 100 [Wh]
0x06	Energy [kWh]
0x07	Energy 10 [kWh]
0xFB 0x00	Energy 100 [kWh]
0xFB 0x01	Energy [MWh]

Table 5: Electricity meter – VIF for meter count[1]

It is allowed to use the VIFE 0x7D (factor 1000) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

[1] If fields of the the gray marked lines are used it may be in contradiction with the required minimum resolution. Refer to [OMSS-Vol2] Tab11!

6.3.1.2 Tests

6.3.1.2.1 Presence

Check if one of the possible combinations (means one DIF and one VIF; must not be in the same line) of Table 4 is in the frame.

6.3.1.2.2 Doublet

Check if only one of the possible combinations of Table 4 is in the frame.

6.3.1.2.3 Resolution

Check if the data point power exists.

YES ==> check if the resolution of the meter count is <= 1 kWh

NO ==> check if the resolution of the meter count is <= 0.1 Wh

6.3.2 [T42-EL2] Data point: Power

6.3.2.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 6: Electricity meter – DIF for power

190

Valid VIFs	Meaning
0x28	Power [mW]
0x29	Power 10 [mW]
0x2A	Power 100 [mW]
0x2B	Power [W]
0x2C	Power 10 [W]
0x2D	Power 100 [W]
0x2E	Power [kW]
0x2F	Power 10 [kW]
0xFB 0x28	Power 100 [kW]
0xFB 0x29	Power [MW]

Table 7: Electricity meter – VIF for power[2]

It is allowed to use the VIFE's 0x70 to 0x77 (factor 0.000001 to 10) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

195 ### 6.3.2.2 Tests

6.3.2.2.1 Presence

Check if the resolution of the metered value is <= 0.1 Wh.

[2] If fields of the the gray marked lines are used it may be in contradiction with the required minimum resolution. Refer to [OMSS-Vol2] Tab11!

YES ==> Power value is not required

NO ==> Check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 6 is in the frame.

6.3.2.2.2 Doublet

Check if only one of the possible combinations of Table 6 is in the frame.

6.3.2.2.3 Resolution

Check if the resolution of the metered value is <= 0.1 Wh.

YES ==> no resolution of the power value is required

NO ==> check if the resolution of the power value is <= 1 W

6.4 Water meters

6.4.1 [T42-W1] Data point: Current consumption Value (meter count)

6.4.1.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 8: Water meter – DIF for meter count

Valid VIFs	Meaning
0x10	Volume [ml]
0x11	Volume 10 [ml]
0x12	Volume 100 [ml]
0x13	Volume [l]
0x14	Volume 10 [l]
0x15	Volume 100 [l]
0x16	Volume [m³]
0x17	Volume 10 [m³]

Table 9: Water meter – VIF for meter count[3]

It is allowed to use the VIFE 0x7D (factor 1000) as an option. In this case the previous VIF shall have set the MSB (VIF OR 0x80).

6.4.1.2 Tests

6.4.1.2.1 Presence

Check if one of the possible combinations (means one DIF and one VIF; must not be in the same line) of Table 8 is in the frame.

[3] If fields of the the gray marked lines are used it may be in contradiction with the required minimum resolution. Refer to [OMSS-Vol2] Tab11!

6.4.1.2.2 Doublet

Check if only one of the possible combinations of Table 8 is in the frame.

6.4.1.2.3 Resolution

Check if the resolution of the meter count is <= 1 m^3.

6.4.2 [T42-W2] Data point: Flow

6.4.2.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 10: Water meter – DIF for flow

Valid VIFs	Meaning
0x38	Volume flow [ml/h]
0x39	Volume flow 10 [ml/h]
0x3A	Volume flow 100 [ml/h]
0x3B	Volume flow [l/h]
0x3C	Volume flow 10 [l/h]
0x3D	Volume flow 100 [l/h]
0x3E	Volume flow [m³/h]
0x3F	Volume flow 10 [m³/h]

Table 11: Water meter – VIF for flow

It is allowed to use the VIFE's 0x70 to 0x77 (factor 0.000001 to 10) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

6.4.2.2 Tests

6.4.2.2.1 Presence

Check if the resolution of the metered value is <= 1 m³

YES ==> Flow value is not required

NO ==> Check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 10 is in the frame.

6.4.2.2.2 Doublet

Check if only one of the possible combinations of Table 10 is in the frame.

6.4.2.2.3 Resolution

There is no special resolution required.

6.5 Heat/Cold meters

6.5.1 [T42-HC1] Data point: Current consumption Value (meter count)

6.5.1.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 12: Heat/Cold meter – DIF for meter count

Valid VIFs	Meaning
0x00	Energy [mWh]
0x01	Energy 10 [mWh]
0x02	Energy 100 [mWh]
0x03	Energy [Wh]
0x04	Energy 10 [Wh]
0x05	Energy 100 [Wh]
0x06	Energy [kWh]
0x07	Energy 10 [kWh]
0xFB 0x00	Energy 100 [kWh]
0xFB 0x01	Energy [MWh]
0x08	Energy [J]
0x09	Energy 10 [J]
0x0A	Energy 100 [J]
0x0B	Energy [kJ]
0x0C	Energy 10 [kJ]
0x0D	Energy 100 [kJ]
0x0E	Energy [MJ]
0x0F	Energy 10 [MJ]

0xFB 0x08	**Energy 100 [MJ]**
0xFB 0x09	**Energy [GJ]**

Table 13: Heat/Cold meter – VIF for meter count

It is allowed to use the VIFE 0x7D (factor 1000) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

255 ### 6.5.1.2 Tests

6.5.1.2.1 Presence

Check if one of the possible combinations (means one DIF and one VIF; must not be in the same line) of Table 10Table 12 is in the frame.

6.5.1.2.2 Doublet

Check if only one of the possible combinations of Table 12 is in the frame.

6.5.1.2.3 Resolution

Check if the data point power exists.

YES ==> No special resolution of the meter count required.

NO ==> Check if the resolution of the meter count is <= 1 kWh (Qp < 10 m³/h),
10 kWh (Qp < 100 m³/h),
100 kWh (Qp >= 100 m³/h)

6.5.2 [T42-HC2] Data point: Power

6.5.2.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

270 **Table 14: Heat/Cold meter – DIF for power**

Valid VIFs	Meaning
0x28	Power [mW]
0x29	Power 10 [mW]
0x2A	Power 100 [mW]
0x2B	Power [W]
0x2C	Power 10 [W]
0x2D	Power 100 [W]
0x2E	Power [kW]
0x2F	Power 10 [kW]
0xFB 0x28	Power 100 [kW]
0xFB 0x29	Power [MW]
0x30	Power [J/h]
0x31	Power 10 [J/h]
0x32	Power 100 [J/h]
0x33	Power [kJ/h]
0x34	Power 10 [kJ/h]
0x35	Power 100 [kJ/h]
0x36	Power [MJ/h]
0x37	Power 10 [MJ/h]
0xFB 0x30	Power 100 [MJ/h]
0xFB 0x31	Power [GJ/h]

Table 15: Heat/Cold meter – VIF for power

It is allowed to use the VIFE's 0x70 to 0x77 (factor 0.000001 to 10) as an option. In this case the previous VIF shall have set the MSB (VIF OR 0x80).

6.5.2.2 Tests

6.5.2.2.1 Presence

Check if the resolution of the meter count is <= 1 kWh (Qp < 10 m³/h),
10 kWh (Qp < 100 m³/h),
100 kWh (Qp >= 100 m³/h)

YES ==> Power value is not required

NO ==> Check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 14 is in the frame.

6.5.2.2.2 Doublet

Check if only one of the possible combinations of Table 14 is in the frame.

6.5.2.2.3 Resolution

There is no special resolution required.

6.6 Heat cost allocation

6.6.1 [T42-H1] Data point: Actual heat cost allocation value (metered value)

6.6.1.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 16: Heat cost allocation – DIF for metered value

Valid VIFs	Meaning
0x6E	Units for H. C. A.

Table 17: Heat cost allocation – VIF for metered value

It is allowed to use the VIFE 0x7D (factor 1000) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

6.6.1.2 Tests

6.6.1.2.1 Presence

Check if one of the possible combinations (means one DIF and the VIF) of Table 16 is in the frame.

6.6.1.2.2 Doublet

Check if only one of the possible combinations of Table 16 is in the frame.

6.6.1.2.3 Resolution

There is no special resolution required.

6.7 Gas meter (temperature converted volume)

6.7.1 [T42-GT1] Data point: Current consumption Value (meter count)

6.7.1.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 18: Gas meter (temperature converted volume) – DIF for meter count

Valid VIFs	Meaning
0x10	Volume [ml]
0x11	Volume 10 [ml]
0x12	Volume 100 [ml]
0x13	Volume [l]
0x14	Volume 10 [l]
0x15	Volume 100 [l]
0x16	Volume [m³]
0x17	Volume 10 [m³]

Table 19: Gas meter (temperature converted volume) – VIF for meter count

It is allowed to use the VIFE 0x7D (factor 1000) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

6.7.1.2 Tests

6.7.1.2.1 Presence

Check if one of the possible combinations (means one DIF and one VIF; must not be in the same line) of Table 18 is in the frame.

6.7.1.2.2 Doublet

Check if only one of the possible combinations of Table 18 is in the frame.

6.7.1.2.3 Resolution

Check if the data point flow exists.

YES ==> check if the resolution of the meter count is <= 1 m^3

NO ==> check if the resolution of the meter count is <=

10 l (Qmax <= 6 m^3/h),

100 l (Qmax <= 60 m^3/h),

1000 l (Qmax > 60 m^3/h)

6.7.2 [T42-GT2] Data point: Flow

6.7.2.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 20: Gas meter (temperature converted volume) – DIF for flow

Valid VIFs	Meaning
0x38	Volume flow [ml/h]
0x39	Volume flow 10 [ml/h]
0x3A	Volume flow 100 [ml/h]
0x3B	Volume flow [l/h]
0x3C	Volume flow 10 [l/h]
0x3D	Volume flow 100 [l/h]
0x3E	Volume flow [m³/h]
0x3F	Volume flow 10 [m³/h]

Table 21: Gas meter (temperature converted volume) – VIF for flow

It is allowed to use the VIFE's 0x70 to 0x77 (factor 0.000001 to 10) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

6.7.2.2 Tests

6.7.2.2.1 Presence

Check if the resolution of the meter count is <= 10 l (Qmax <= 6 m³/h),
100 l (Qmax <= 60 m³/h),
1000 l (Qmax > 60 m³/h)

YES ==> Flow value is not required

NO ==> Check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 20 is in the frame.

6.7.2.2.2 Doublet

350 Check if only one of the possible combinations of Table 20 is in the frame.

6.7.2.2.3 Resolution

Check if the resolution of the meter count is <= 10 l (Qmax <= 6 m³/h),
100 l (Qmax <= 60 m³/h),
1000 l (Qmax > 60 m³/h)

355 YES ==> no special resolution of the flow value is required

NO ==> check if the resolution of the flow value is <= 10 l/h (Qmax <= 6 m³/h),
100 l/h (Qmax <= 60 m³/h),
1000 l/h (Qmax > 60 m³/h)

6.7.3 [T42-GT3] Data point: Base temperature

6.7.3.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 22: Gas meter (temperature converted volume) – DIF for base temperature

Valid VIFs	Meaning
0xD8 0x3E	Base temp. [m℃]
0xD9 0x3E	Base temp. [m℃]
0xDA 0x3E	Base temp. [m℃]
0xDB 0x3E	Base temp. [℃]

Table 23: Gas meter (temperature converted volume) – VIF for base temperature

6.7.3.2 Tests

6.7.3.2.1 Presence

If the base temperature for the compensation is not 15℃, check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 22 is in the frame.

6.7.3.2.2 Doublet

Check if only one of the possible combinations of Table 22 is in the frame.

6.7.3.2.3 Resolution

There is no special resolution required.

6.8 Gas meter (volume at measurement conditions)

6.8.1 [T42-GM1] Data point: Current consumption Value (meter count)

6.8.1.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 24: Gas meter (volume at measurement conditions) – DIF for meter count

Valid VIFs	Meaning
0x90 0x3A	Volume [ml]
0x91 0x3A	Volume 10 [ml]
0x92 0x3A	Volume 100 [ml]
0x93 0x3A	Volume [l]
0x94 0x3A	Volume 10 [l]
0x95 0x3A	Volume 100 [l]
0x96 0x3A	Volume [m³]
0x97 0x3A	Volume 10 [m³]

Table 25: Gas meter (volume at measurement conditions) – VIF for meter count[4]

It is allowed to use the VIFE 0x7D (factor 1000) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

[4] If fields of the the gray marked lines are used it may be in contradiction with the required minimum resolution. Refer to [OMSS-Vol2] Tab11!

6.8.1.2 Tests

6.8.1.2.1 Presence

Check if one of the possible combinations (means one DIF and one VIF; must not be in the same line) of Table 24 is in the frame.

390 #### 6.8.1.2.2 Doublet

Check if only one of the possible combinations of Table 24 is in the frame.

6.8.1.2.3 Resolution

Check if the data point flow exists.

YES ==> check if the resolution of the meter count is <= 1 m^3

395 NO ==> check if the resolution of the meter count is <= 10 l (Qmax <= 6 m^3/h),
100 l (Qmax <= 60 m^3/h),
1000 l (Qmax > 60 m^3/h)

6.8.2 [T42-GM2] Data point: Flow

6.8.2.1 Informative

400

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 26: Gas meter (volume at measurement conditions) – DIV for flow

Valid VIFs	Meaning
0xB8 0x3A	Volume flow [ml/h]
0xB9 0x3A	Volume flow 10 [ml/h]
0xBA 0x3A	Volume flow 100 [ml/h]
0xBB 0x3A	Volume flow [l/h]
0xBC 0x3A	Volume flow 10 [l/h]
0xBD 0x3A	Volume flow 100 [l/h]
0xBE 0x3A	Volume flow [m³/h]
0xBF 0x3A	Volume flow 10 [m³/h]

Table 27: Gas meter (volume at measurement conditions) – VIF for flow

405

It is allowed to use the VIFE's 0x70 to 0x77 (factor 0.000001 to 10) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

6.8.2.2 Tests

6.8.2.2.1 Presence

410 Check if the resolution of the meter count is <= 10 l (Qmax <= 6 m³/h),
100 l (Qmax <= 60 m³/h),
1000 l (Qmax > 60 m³/h)

YES ==> Flow value is not required

NO ==> Check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 26 is in the frame.

6.8.2.2.2 Doublet

Check if only one of the possible combinations of Table 26 is in the frame.

6.8.2.2.3 Resolution

Check if the resolution of the meter count is <= 10 l (Qmax <= 6 m³/h),
100 l (Qmax <= 60 m³/h),
1000 l (Qmax > 60 m³/h)

YES ==> no special resolution of the flow value is required

NO ==> check if the resolution of the flow value is <= 10 l/h (Qmax <= 6 m³/h),
100 l/h (Qmax <= 60 m³/h),
1000 l/h (Qmax > 60 m³/h)

6.9 Gas meter (volume at base conditions)

6.9.1 [T42-GB1] Data point: Current consumption Value (meter count)

6.9.1.1 Informative

430

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 28: Gas meter (volume at base conditions) – DIF for meter count

Valid VIFs	Meaning
0x90 0x3E	Volume [ml]
0x91 0x3E	Volume 10 [ml]
0x92 0x3E	Volume 100 [ml]
0x93 0x3E	Volume [l]
0x94 0x3E	Volume 10 [l]
0x95 0x3E	Volume 100 [l]
0x96 0x3E	Volume [m³]
0x97 0x3E	Volume 10 [m³]

Table 29: Gas meter (volume at base conditions) – VIF for meter count[5]

435 It is allowed to use the VIFE 0x7D (factor 1000) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

[5] If fields of the the gray marked lines are used it may be in contradiction with the required minimum resolution. Refer to [OMSS-Vol2] Tab11!

6.9.1.2 Tests

6.9.1.2.1 Presence

Check if one of the possible combinations (means one DIF and one VIF; must not be in the same line) of Table 28 is in the frame.

6.9.1.2.2 Doublet

Check if only one of the possible combinations of Table 28 is in the frame.

6.9.1.2.3 Resolution

Check if the data point flow exists.

YES ==> check if the resolution of the meter count is <= 1 m^3

NO ==> check if the resolution of the meter count is <=

10 l (Qmax <= 6 m^3/h),

100 l (Qmax <= 60 m^3/h),

1000 l (Qmax > 60 m^3/h)

6.9.2 [T42-GB2] Data point: Flow

6.9.2.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

Table 30: Gas meter (volume at base conditions) – DIF for flow

Valid VIFs	Meaning
0xB8 0x3E	Volume flow [ml/h]
0xB9 0x3E	Volume flow 10 [ml/h]
0xBA 0x3E	Volume flow 100 [ml/h]
0xBB 0x3E	Volume flow [l/h]
0xBC 0x3E	Volume flow 10 [l/h]
0xBD 0x3E	Volume flow 100 [l/h]
0xBE 0x3E	Volume flow [m³/h]
0xBF 0x3E	Volume flow 10 [m³/h]

Table 31: Gas meter (volume at base conditions) – VIF for flow

It is allowed to use the VIFE's 0x70 to 0x77 (factor 0.000001 to 10) as an option. In this case the previous VIF byte shall have set the MSB (VIF OR 0x80).

6.9.2.2 Tests

6.9.2.2.1 Presence

Check if the resolution of the meter count is <= 10 l (Qmax <= 6 m³/h),
100 l (Qmax <= 60 m³/h),
1000 l (Qmax > 60 m³/h)

YES ==> Flow value is not required

NO ==> Check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 30 is in the frame.

6.9.2.2.2 Doublet

Check if only one of the possible combinations of Table 30 is in the frame.

6.9.2.2.3 Resolution

Check if the resolution of the meter count is <= 10 l (Qmax <= 6 m³/h),
100 l (Qmax <= 60 m³/h),
1000 l (Qmax > 60 m³/h)

YES ==> no special resolution of the flow value is required

NO ==> check if the resolution of the flow value is <= 10 l/h (Qmax <= 6 m³/h),
100 l/h (Qmax <= 60 m³/h),
1000 l/h (Qmax > 60 m³/h)

6.9.3 [T42-GB3] Data point: Base pressure

6.9.3.1 Informative

Valid DIF's	Meaning
0x02	2 Byte integer
0x03	3 Byte integer
0x04	4 Byte integer
0x06	6 Byte integer
0x07	8 Byte integer
0x0A	4 digit BCD
0x0B	6 digit BCD
0x0C	8 digit BCD
0x0E	12 digit BCD

480 **Table 32: Gas meter (volume at base conditions) – DIF for base pressure**

Valid VIFs	Meaning
0xE8 0xF3 0x3E	Base pressure [µbar]
0xE9 0xF3 0x3E	Base pressure 10 [µbar]
0xEA 0xF3 0x3E	Base pressure 100 [µbar]
0xEB 0xF3 0x3E	Base pressure [mbar]
0xE8 0x3E	Base pressure [mbar]
0xE9 0x3E	Base pressure 10 [mbar]
0xEA 0x3E	Base pressure 100 [mbar]
0xEB 0x3E	Base pressure [bar]

Table 33: Gas meter (volume at base conditions) – VIF for base pressure

6.9.3.2 Tests

485 #### 6.9.3.2.1 Presence

If the base pressure for the compensation is not 1013.25 mbar, check if one of the possible combinations (means one DIF and one VIF, must not be in the same line) of Table 32 is in the frame.

6.9.3.2.2 Doublet

490 Check if only one of the possible combinations of Table 32 is in the frame.

6.9.3.2.3 Resolution

There is no special resolution required.

Appendix A: Applicable Test cases of OMS-CT (Normativ)

1. Test cases of M-Bus and wireless M-Bus devices

Test case	Description	EL[1)]	W[2)]	HC[3)]	H[4)]	G[5)]	UDR[6)]	MUC[7)]
[T41-CI1]	CI-Field	M	M	M	M	M	N	N
[T41-AD1]	Address	M	M	M	M	M	N	N
[T41-AN1]	Access Number	M	M	M	M	M	N	N
[T41-ST1]	Status	M	M	M	M	M	N	N
[T41-CW1]	Configuration Word	M	M	M	M	M	N	N
[T41-E1]	Encryption	M	M	M	M	M	N	N
[T41-E2]	Decryption						N	N
[T42-P1]	Parsing an M-Bus-String						N	N
[T42-GD1]	Generic Data points	N	N	N	N	N	N	N
[T42-EL1]	meter count	M					N	N
[T42-EL2]	Power	O					N	N
[T42-W1]	Meter count		M				N	N
[T42-W2]	Flow		O				N	N
[T42-HC1]	Meter count			M			N	N
[T42-HC2]	Power			O			N	N
[T42-H1]	Meter count				M		N	N
[T42-GT1]	Meter count					A1	N	N
[T42-GT2]	Flow					O	N	N
[T42-GT3]	Base temperature					O	N	N
[T42-GM1]	Meter count					A1	N	N
[T42-GM2]	Flow					O	N	N
[T42-GB1]	Meter count					A1	N	N
[T42-GB2]	Flow					O	N	N
[T42-GB3]	Base pressure					O	N	N

Note:

M	This Test case is mandatory (Data point has to exist!)	
O	This Test case is applied only; if data point exists	
Ax	One alternative Test case with same x is mandatory (Data point has to exist!)	
N	Test case is not defined yet	
1)	EL	= Electricity Meter
2)	W	= Water meter (heat and cold)
3)	HC	= Heat Coast Allocator
4)	H	= Heat meter (also Cooling meter or combined Heat/Cooling meter)
5)	G	= Gas meter
6)	UDR	= Unidirectional Repeater
7)	MUC	= Multi utility communication controller

Table 34: Test Cases related to DUT type