



Open Metering System **Conformance Test**

Volume 6 **Sensors**

Issue 1.0.1 / 2023-03-21

RELEASE

Document History

Version	Date	Comment	Editor
0.0.1	2022-04-30	First draft	TF Sensors, A. Reissinger
0.0.2	2022-06-24	Copyright remark added to front page	A. Reissinger
0.0.3	2022-11-10	Finalizing content and formatting	A. Herz
0.0.4	2022-11-11	Review in TF-Sensors Editorial changes	TF Sensors A. Reissinger
1.0.0	2023-01-23	Editorial changes Release candidate	A. Reissinger
1.0.1	2023-03-08 and 2023-03-21	Consideration of review comments Final editing in meeting #89 Release	AG3, A. Reissinger

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1 Scope

The present document is part of the Conformance Test Specification used for certification of equipment according to the Open Metering System (OMS) specification.

This issue is applicable only together with [OMS-CT1.GP].

- 5 This document specifies the tests to show conformance for Sensors that are defined in OMS Specification Volume 2, Primary Communication [OMS-S2], Annex C, Release A.

The parameters to be tested, and the test limits are based on OMS Specification Volume 2, Primary Communication [OMS-S2] including [OMS-S2]Annex C, Release A.

- 10 **NOTE:** This version of test specification does not cover all items of the current OMS Specification.

2 References

The references used are listed in [OMS-CT1.GP].

3 Definitions, Symbols and Abbreviations

The term definitions, symbols and abbreviations used are defined in [OMS-CT1.GP] (OMS Open Metering System – Conformance Test Volume 1 – General Part).

4 Test Cases for M-Bus-Application Frames

4.1 Introduction

This chapter describes the test procedures for Sensors as defined in [OMS-S2] Annex C, Release A.

4.2 [T61-GSD*] Generic Test Cases

The generic sensor data points are applicable for all sensor devices (see Table 1).

Table 1: Generic data points for all devices – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre. ^a	Dbl. ^a	Enc. ^a	Res. ^a	
[T61-GSD1] - 1	DP5!	O ^b	x ^c	O ^d	-	Not applicable for Smoke Alarm Devices and CO Alarm Device
[T61-GSD2] - 1	DP6!	O	x	O	-	
[T61-GSD3] - 1	DT1!	O1 ^b	x	O	-	
[T61-GSD4] - 1	DT2!	O1	x	O	-	
[T61-GSD5] - 1	ID1!	O	x	N ^d	-	
[T61-GSD6] - 1	ID2!	O	x	N	-	
[T61-GSD7] - 1	ID3!	O	x	N	-	
[T61-GSD8] - 1	ID4!	O	x	O	-	
[T61-GSD9] - 1	ID5!	O	x	O	-	
[T61-GSD10] - 1	ID6!	O	x	O	-	
[T61-GSD11] - 1	ID7!	O	x	N	-	
[T61-GSD12] - 1	ID8!	O	x	N	-	
[T61-GSD13] - 1	ID9!	M ^b	x	N	-	Not applicable for Pressure Device and Smoke Alarm Devices
[T61-GSD14] - 1	MM1!	O	x	O	-	
[T61-GSD15] - 1	MM1!!	O	x	O	-	
[T61-GSD16] - 1	MM1!E	O	x	O	-	
[T61-GSD17] - 1	MM2!	C ^b	x	O	-	Condition: See OMS-S2 Annex M OMS-UC-06
[T61-GSD18] - 1	MM3!	M	x	O	-	Not applicable for Pressure Device, Smoke Alarm Devices and CO Alarm Device
[T61-GSD19] - 1	MM4!	O	x	O	-	
[T61-GSD20] - 1	MM8!	O	x	O	-	Not applicable for Heart Beat Sensor
[T61-GSD21] - 1	MM12!	O	x	Y ^d	-	
^a see chapter 5 and OMS-CTS Vol. 4 APL [OMS-CT4.APL], 8.3.4 ^b see 5.2 and OMS-CTS Vol. 4 APL [OMS-CT4.APL], 8.3.4.1 ^c see OMS-CTS Vol. 4 APL [OMS-CT4.APL], 8.3.4.2 ^d see 5.3 and OMS-CTS Vol. 4 APL [OMS-CT4.APL], 8.3.4.4						

4.3 [T61-PRES*] Pressure Device

All following test of this subclause are applicable for the device types shown in Table 2.

Table 2: Pressure device – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Pressure device	18h	-

The Pressure Device shall pass the following test cases:

Table 3: Pressure device – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-PRES*1]	ID9!	O	x	N	-	
[T61-PRES*2]	MM3!	C	x	O	-	Condition: See OMS-S2 Annex M OMS-UC-06
[T61-PRES*3]	MM13!	M	x	Y	-	
[T61-PRES*4]	PR1!	A1	x	Y	-	
[T61-PRES*5]	PR2!	A1	x	Y	-	
[T61-PRES*6]	PR3!	M ^a	x	Y	-	
[T61-PRES*7]	PR4!	M ^a	x	Y	-	
[T61-PRES*8]	TC4!	O	x	Y	-	
^a only mandatory for static datagrams						

4.4 [T61-SMAD*] Smoke Alarm Device

All following test of this subclause are applicable for the device types shown in Table 4.

Table 4: Smoke alarm device – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Smoke alarm device	1Ah	-

The Smoke Alarm Device shall pass the following test cases:

Table 5: Smoke alarm device – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	DbI.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-SMAD0]	AD4!	O	x	Y	-	
[T61-SMAD1]	AD5!	O	x	Y	-	
[T61-SMAD2]	AD6!	O	x	Y	-	
[T61-SMAD3]	AD7!	O	x	Y	-	
[T61-SMAD4]	AD8!	O	x	Y	-	
[T61-SMAD5]	AD9!	O	x	Y	-	
[T61-SMAD6]	AD10!	O	x	Y	-	
[T61-SMAD7]	AD11!	O	x	Y	-	
[T61-SMAD8]	AD12!	O	x	Y	-	
[T61-SMAD9]	AD13!	O	x	Y	-	
[T61-SMAD10]	AD14!	O	x	Y	-	
[T61-SMAD11]	DP5!	A1	x	O	-	
[T61-SMAD12]	DP6!	A1	x	O	-	
[T61-SMAD13]	DT1!Xn	O2	x	Y	-	
[T61-SMAD14]	DT2!Xn	O2	x	Y	-	
[T61-SMAD15]	ID9!	O	x	N	-	
[T61-SMAD16]	MM3!	C	x	O	-	Condition: See OMS-S2 Annex M OMS-UC-06
[T61-SMAD17]	MM15!	M	x	Y	-	
[T61-SMAD18]	TC5!	O	x	Y	-	
[T61-SMAD19]	TC6!	O	x	Y	-	

4.5 [T61-HUMID*] Humidity Sensor

All following test of this subclause are applicable for the device types shown in Table 6.

Table 6: Humidity Sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	01h

The Humidity Sensor shall pass the following test cases:

Table 7: Humidity Sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-HUMID1]	RH1!	M	x	Y	-	
[T61-HUMID2]	TC2!	O	x	Y	-	
[T61-HUMID3]	TC4!	O	x	Y	-	

4.6 [T61-MOIST*] Moisture Sensor

All following test of this subclause are applicable for the device types shown in Table 8.

Table 8: Moisture Sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	02h

The Moisture Sensor shall pass the following test cases:

Table 9: Moisture Sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-MOIST3]	MO1!	M	x	Y	-	
[T61-MOIST4]	TC2!	O	x	Y	-	
[T61-MOIST5]	TC4!	O	x	Y	-	

4.7 [T61-TEMP*] Temperature Sensor

All following test of this subclause are applicable for the device types shown in Table 10.

Table 10: Temperature Sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	03h

The Temperature Sensor shall pass the following test cases:

Table 11: Temperature Sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-TEMP1]	RH1!	O	x	Y	-	
[T61-TEMP2]	TC4!	M	x	Y	-	
[T61-TEMP3]	TC5!	O	x	Y	-	
[T61-TEMP4]	TC6!	O	x	Y	-	

4.8 [T61-COND*] Conductivity Sensor

All following test of this subclause are applicable for the device types shown in Table 10.

Table 12: Conductivity Sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	04h

The Conductivity Sensor shall pass the following test cases:

Table 13: Conductivity Sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	DbI.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-COND1]	CD1!	M	x	Y	-	

4.9 [T61-LIGHT*] Light Sensor

All following test of this subclause are applicable for the device types shown in Table 10.

Table 14: Light Sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	05h

The Light Sensor shall pass the following test cases:

Table 15: Light Sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-LIGHT1]	IR1!	O	x	Y	-	
[T61-LIGHT2]	LT1!	A1	x	Y	-	
[T61-LIGHT3]	LT2!	A1	x	Y	-	

4.10 [T61-RFS*] Rainfall Sensor

All following test of this subclause are applicable for the device types shown in Table 16.

Table 16: Rainfall sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	06h

The Rainfall Sensor shall pass the following test cases:

Table 17: Rainfall sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-RFS1]	RF1!	M	x	Y	-	
[T61-RFS2]	VF1!	O	x	Y	-	

4.11 [T61-PHS*] pH Sensor

All following test of this subclause are applicable for the device types shown in Table 18.

Table 18: pH sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	07h

The pH Sensor shall pass the following test cases:

Table 19: pH sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-PHS1]	PH1!	M	x	Y	-	

4.12 [T61-ANM*] Anemometer

All following test of this subclause are applicable for the device types shown in Table 20.

Table 20: Anemometer– supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	08h

The Anemometer shall pass the following test cases:

Table 21: Anemometer– Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-ANM1]	WS1!	M	x	Y	-	

4.13 [T61-GLBD*] Glass Break Detector

All following test of this subclause are applicable for the device types shown in Table 22.

Table 22: Glass Break Detector device – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	09h

The Glass Break Detector shall pass the following test cases:

Table 23: Glass Break Detector – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-GLBD1]	ND1!	A1	x	Y		
[T61-GLBD2]	TS1!	A1	x	Y		

4.14 [T61-DWCS*] Door/Window Contact Sensor

All following test of this subclause are applicable for the device types shown in Table 24.

Table 24: Door/Window Contact Sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	0Ah

The Door/Window Contact Sensor shall pass the following test cases:

Table 25: Door/Window Contact Sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-DWCS1]	CD1!	O	x	Y	-	
[T61-DWCS2]	ER1!	O	x	Y	-	
[T61-DWCS3]	MM16!	M	x	Y	-	

4.15 [T61-LWDD*] Locked Window/Door Detector

All following test of this subclause are applicable for the device types shown in Table 26.

Table 26: Locked Window/Door Detector – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	0Bh

The Locked Window/Door Detector shall pass the following test cases:

Table 27: Locked Window/Door Detector – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-LWDD1]	CD1!	O	x	Y	-	
[T61-LWDD2]	ER1!	O	x	Y	-	
[T61-LWDD3]	MM16!	M	x	Y	-	

4.16 [T61-WLD*] Water Leakage Detector

All following test of this subclause are applicable for the device types shown in Table 28.

Table 28: Water leakage detector – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	0Ch

The Water Leakage Detector shall pass the following test cases:

Table 29: Water leakage detector – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-WLD1]	VF1!	O	x	Y	-	

4.17 [T61-AQS*] Air Quality Sensor

All following test of this subclause are applicable for the device types shown in .

Table 30: Air quality sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	0Dh

The Air Quality Sensor shall pass the following test cases:

Table 31: Air quality sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-AQS1]	CC1!	O	x	Y	-	
[T61-AQS2]	CC2!	O	x	Y	-	
[T61-AQS3]	DT1!Xn	O2	x	Y	-	
[T61-AQS4]	DT2!Xn	O2	x	Y	-	
[T61-AQS5]	PT1!	O	x	Y	-	
[T61-AQS6]	PT2!	O	x	Y	-	
[T61-AQS7]	PT3!	O	x	Y	-	
[T61-AQS8]	PT4!	O	x	Y	-	
[T61-AQS9]	PT5!	O	x	Y	-	
[T61-AQS10]	PT6!	O	x	Y	-	
[T61-AQS11]	PT7!	O	x	Y	-	
[T61-AQS12]	PT8!	O	x	Y	-	
[T61-AQS13]	RH1!	O	x	Y	-	
[T61-AQS14]	TC2!	O	x	Y	-	
[T61-AQS15]	TC4!	O	x	Y	-	
[T61-AQS16]	VC1!	A1	x	Y	-	
[T61-AQS17]	VC2!	A1	x	Y	-	

4.18 [T61-CO2S*] Carbon Dioxide Sensor

All following test of this subclause are applicable for the device types shown in Table 32.

Table 32: Carbon dioxide sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	0Eh

The Carbon Dioxide Sensor shall pass the following test cases:

Table 33: Carbon dioxide sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-CO2S1]	CC2!	M	x	Y	-	
[T61-CO2S2]	DT1!Xn	O2	x	Y	-	
[T61-CO2S3]	DT2!Xn	O2	x	Y	-	
[T61-CO2S4]	PT1!	O	x	Y	-	
[T61-CO2S5]	PT2!	O	x	Y	-	
[T61-CO2S6]	PT3!	O	x	Y	-	
[T61-CO2S7]	PT4!	O	x	Y	-	
[T61-CO2S8]	PT5!	O	x	Y	-	
[T61-CO2S9]	PT6!	O	x	Y	-	
[T61-CO2S10]	PT7!	O	x	Y	-	
[T61-CO2S11]	PT8!	O	x	Y	-	
[T61-CO2S12]	VC1!	O	x	Y	-	
[T61-CO2S13]	VC2!	O	x	Y	-	

4.19 [T61-TS*] Turbidity Sensor

All following test of this subclause are applicable for the device types shown in Table 34.

Table 34: Turbidity sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	0Fh

The Turbidity Sensor shall pass the following test cases:

Table 35: Turbidity sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-TS6]	TB1!	M	x	Y	-	

4.20 [T61-HBS*] Heart Beat Sensor

All following test of this subclause are applicable for the device types shown in Table 36.

Table 36: Heart beat sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	10h

The Heart Beat Sensor shall pass the following test cases:

Table 37: Heart beat sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-HBS5]	MM8!	M	x	O	-	
[T61-HBS6]	PF1!	M	x	Y	-	

4.21 [T61-IMP*] Impedance Sensor

All following test of this subclause are applicable for the device types shown in Table 38.

Table 38: Impedance sensor – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	11h

The Impedance Sensor device shall pass the following test cases:

Table 39: Impedance sensor – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-IMP1]	ER1!	M	x	Y	-	

4.22 [T61-COAD*] CO Alarm Device

All following test of this subclause are applicable for the device types shown in Table 40.

Table 40: CO alarm device – supported Device Types

Device Type	Code (refer to [OMS-S2], table 2)	Sub device type (ID9!)
Sensor device	00h	12h

The CO Alarm Device shall pass the following test cases:

Table 41: CO alarm device – Test cases

Reference	Related MB-Tag in Annex B of [OMS-S2]	Applicable Tests (see chapter 5)				Remarks
		Pre.	Dbl.	Enc.	Res.	
[T61-GSD*]	See 0					Applicable tests are defined in 0
[T61-COAD1]	AD4!	O	x	Y	-	
[T61-COAD2]	AD5!	O	x	Y	-	
[T61-COAD3]	AD6!	O	x	Y	-	
[T61-COAD4]	AD7!	O	x	Y	-	
[T61-COAD5]	AD8!	O	x	Y	-	
[T61-COAD6]	AD9!	O	x	Y	-	
[T61-COAD7]	AD10!	O	x	Y	-	
[T61-COAD8]	AD11!	O	x	Y	-	
[T61-COAD9]	AD12!	O	x	Y	-	
[T61-COAD10]	AD13!	O	x	Y	-	
[T61-COAD11]	AD14!	O	x	Y	-	
[T61-COAD12]	CC1!	M	x	Y	-	
[T61-COAD13]	DP5!	A1	x	O	-	
[T61-COAD14]	DP6!	A1	x	O	-	
[T61-COAD15]	DT1!Xn	O2	x	Y	-	
[T61-COAD16]	DT2!Xn	O2	x	Y	-	
[T61-COAD17]	MM3!	C	x	O	-	
[T61-COAD18]	MM14!	M	x	Y	-	
[T61-COAD19]	TC5!	O	x	Y	-	
[T61-COAD20]	TC6!	O	x	Y	-	

5 Check an M-Bus-Application Frame

5.1 Reference to OMS-CTS

See for the details [OMS-CT4.APL], clause 8 and additionally the following clauses.

5.2 Presence

- 5 If field 'Pre.' contains a 'C' (for conditional) check [OMS-S2], Annex B for the condition.

5.3 Encryption

If field 'Enc.' contains a 'Y' encryption is mandatory. Check if encryption is applied. Otherwise the test is failed.

- 10 If field 'Enc.' contains an 'N' encryption is not permitted. Check if data is not encrypted. Otherwise the test is failed.

If field 'Enc.' contains an 'O' encryption is optional.