Technical Prescriptions

Digital Meter Systems eMUCS-P1

TAU-301.4-K03_TVS

Revisions

Version	Modification	Date	Author(s)
E.1.3.0	Publication (EAN17AL005)	16/05/2017	FLUVIUS
E.2.0.0	Publication (FLU20IT017)	11/12/2020	FLUVIUS
E.2.1	Changes in yellow CR_MUT01: 2.2: Change wording: Output state virtual relay -> virtual relay state (to be consistent with breaker state and published attribute. Note: Only (0) and (1) can be published) CR_MUT01: 7.2: Maximum demand – Active energy import of the last 13 months, attributes corrected (also sequence in 2.3) CR_MUT01: 7.2: Current average value A+ added. Examples updated with new object and correct sequence.	02/05/2022	FLUVIUS

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1 Context

1.1 Introduction

This document is part of a set of interface companion specification documents for a digital meter system intended for electricity, gas, water and possibly other provisions.

This release of this specification is adhered to by all Belgian DSO's; id est Fluvius, ORES, RESA and Sibelga.

For words or abbreviations in blue (with a hyperlink), like contractor, you will find an explanation in Table 8 Definitions and Abbreviations on pag. 18 of this document.
Textstrings in green (with a hyperlink), like eMUCs-P1 refer to the identification of a document with title, author and version in in appendix A – References on pag. 19 of this document.

1.2 Assignment objectives

You will find the purpose and scope of this tender in the 'overarching specifications' document. This document and other documents together with the 'overarching specifications' are part of a tendering procedure.

This 'technical prescriptions' document is an integral part of the 'Technical Specifications' document of digital meters, in which you will find one or more specification frames on how all prescriptions must be taken into account.

This 'technical prescriptions' document is 'extractable' added as an attachment to the 'technical specifications' document it belongs to.

1.3 Document scope

The goal of this companion specification is to reach an open, standardised protocol implementation related to the communication of several types of electricity meters with other metering systems and devices.

This document specifies the communication protocol layers and the application interface P1 between a 'Consumer Energy Management System' (CEMS) and the electricity meter (see Figure 1 Digital meter system architecture and related eMUCS documents on pag. 6).

The application layer and data model of the electricity meter are based on 'DSMR-P1'. This companion specification adds clarifications towards this 'DSMR-P1' or describes extensions with respect to this 'DSMR-P1'.

1.4 System architecture & related documents

The illustration below shows the relation of this eMUCS document with the interface architecture of the digital meter system for electricity, gas and water and the concerning other eMUCS documents.

The system architecture and naming conventions for the interfaces are based on 'IDIS Package 3, section 5'.

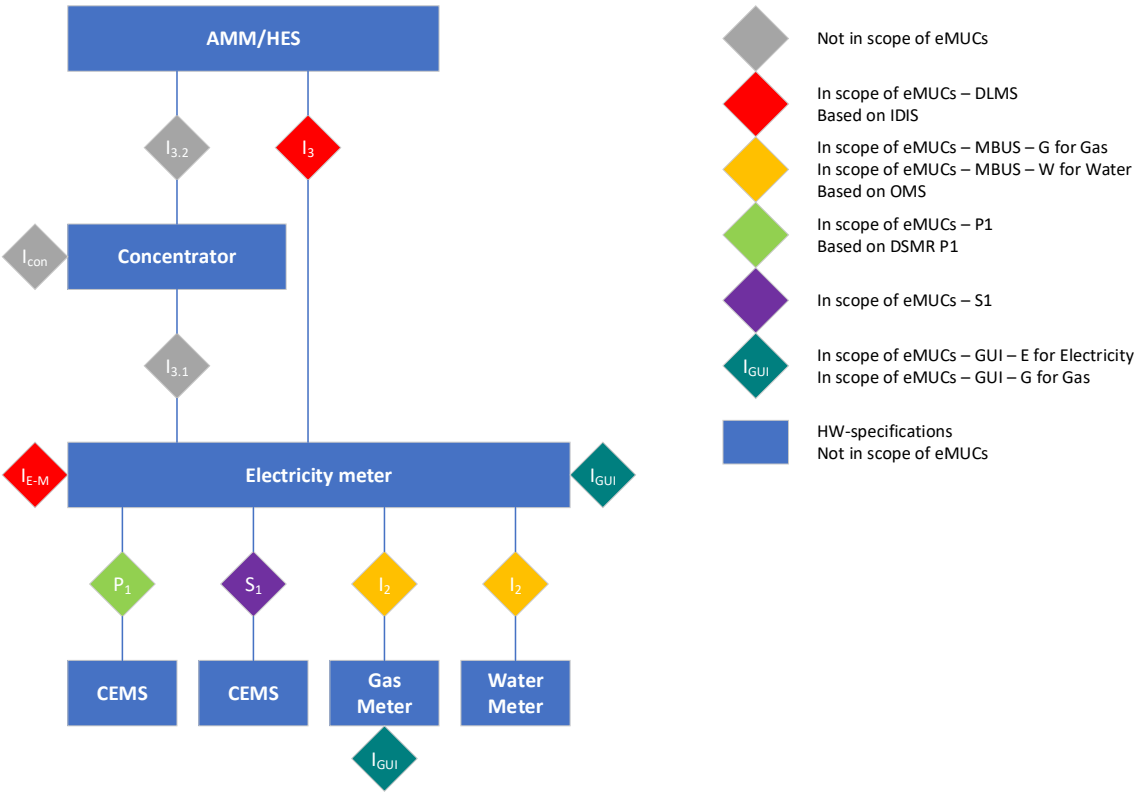

Figure 1 Digital meter system architecture and related eMUCS documents

1.4.1 I_3 interface

The I_3 interface enables 'DLMS' communication between the electricity meter and the remote application that resides in the AMM/HES.

The I_3 interface is based on the 'IDIS Package 3' interface specification together with the clarifications and extensions on it as described in the eMUCS-M_{DLMS} document.

1.4.2 I_2 interface

The I_2 interface enables communication between M-Bus devices to an electricity meter that implements the 'IDIS Package 3' interface specification with extension M.

According to the IDIS Package 3 interface specifications – extension M, both wired and wireless devices can be connected to the electricity meter. In the interface companion specifications eMUCs-M_{MBUS}-*X* documents (where X equals G for gas, W for water, etcetera), **the scope is limited to wireless M-Bus devices**.

The number of M-Bus channels for the electricity meter is extended from 4 to 8. The related data model extensions are specified in the eMUCS-M_{DLMS}.

The I_2 interface is based on the OMS interface specifications including the clarifications on the OMS interface specifications and extensions on it as described in the eMUCs-M_{MBUS}-*X* documents.

The M-Bus transmission modes can vary among device types. The electricity meter will support all transmission modes for all device types in scope (see the overarching tender documents) as prescribed in the eMUCs-M_{MBUS}-*X* documents.

1.4.3 P_1 interface

The P_1 interface enables communication between the electricity meter and a local CEMS application. The purpose of the P_1 interface is to locally provide measurement data and status information of the electricity meter and all connected M-Bus devices to the consumer.

The P_1 interface is based on the 'DSMR-P1' specification together with the clarifications and extensions on it, as described in the eMUCs-P1 document. The eMUCS-M_{DLMS} document describes the data model extensions necessary to support the described functionality in eMUCS-P1.

1.4.4 S_1 interface

The S_1 interface enables communication between the electricity meter and a local CEMS application. The purpose of the S_1 interface is to locally provide measurement data to the consumer. The frequency of transmission on this interface is much higher than on the P_1 interface. The S_1 interface provides only measurement values of the electricity meter.

The S_1 interface is described in the eMUCs-S1 document. The eMUCS-M_{DLMS} document describes the data model extensions necessary to support the described functionality in eMUCS-S1.

1.4.5 $I_{E\text{-}M}$ interface

The $I_{E\text{-}M}$ interface enables communication between the electricity meter and a local client application; for example, a maintenance application on a laptop that is coupled with an optical interface to the electricity meter.

With respect to the application layer, security and data model, the $I_{E\text{-}M}$ interface is identical to the I_3 interface.

1.4.6 I_{GUI} interface

The I_{GUI} interface enables interaction between a meter and the consumer or technician.

The I_{GUI} interface for the electricity meter is fully described in the eMUCs-GUI-E document and the I_{GUI} interface for the gas meter is fully described in the eMUCs-GUI-G document.

2 General prescriptions

This chapter specifies the main characteristics of the Belgian P1 interface. The Belgian P1 interface provides electrical, gas and water related measurements such as power, energy, voltage, current, volume, … and status information coming from the measurement system.

The Belgian P1 interface provides every second instantaneous values.

2.1 Interface

2.1.1 Physical

Section 5 of 'DSMR-P1' is fully applicable. Only some highlights and attention points of section 5 of 'DSMR-P1' are given in this document.

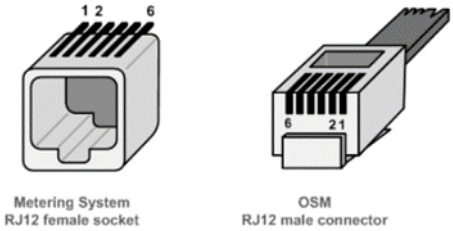

Figure 2 P1 – Physical connector

Pin	Signal name	Description	Remark
1	+5V	+5V power supply	
2	Data Request	Data Request	
3	Data GND	Data ground	
4	NC	Not Connected	
5	Data	Data line	Open Collector
6	GND	Power ground	

Table 2 P1 – Physical connector pin assignment

Note 1 The Belgian P1 interface can be deactivated by the DSO. This means that in case the Belgian P1 interface is deactivated, also the power supply on the physical interface is cut off.

Note 2 To request data from the Belgian P1 interface, the CEMS should make the 'Data Request' line high (even when the Belgian P1 interface is activated, see note 1).

Note 3 The Data line is an output with 'open collector'. This means that the CEMS should make this line 'high' via a pull-up resistor. The value of this resistor is chosen in such a way that the 'data line' max. current ($I_{D\_0\_MAX}$) is not exceeded, as specified in 'DSMR-P1'.

2.1.2 Communication port settings

The Belgian P1 interface transfers data with following settings:

Parameter	Setting
Data rate (fixed)	115.200 Baud
Start bits	1
Data bits	8
Parity	none
Stop bit	1

Table 3 P1 – Communication port settings

2.2 Protocol description

Section 6 of 'DSMR-P1' is applicable.

To support pushing of 'Profile Generic' classes (classID 7) in a more general way, and not only related to the 'Power Failure' logs, following clarifications will be made on section 6.11 of 'DSMR-P1':

Preamble			Payload			
			Entry 1		…	Entry x
ID	(z)	(ID_1)…(ID_n)	(TST)	($Bv_1 1*U_1 1$)…($Bv_n 1*U_n 1$)	…	(TST) ($Bv_1 z*U_1 z$)…($Bv_n z*U_n z$)
note 1	note 2	note 3	Note 4	note 5		note 6

Figure 3 Formatting of a generic profile in the P1-telegram

Note 1 OBIS Reduced ID-code of the profile generic instance

Note 2 Numbers of entries z (max. 15)

Note 3 Identification of buffer values (OBIS 'Reduced ID codes' of the capture_objects attribute) except the 'clock' object (first object in the buffer) and 'AMR-status byte'(second object in the buffer)

Note 4 timestamp (TST) out of the 'clock' object (first object in the buffer) of the Entry in the buffer of the 'profile generic' instance

Note 5 Content of the buffer first element ('clock' and 'AMR-status byte' excluded)

Note 6 Content of the buffer last element z

Example telegram for the buffer content of Figure 4 Example buffer content of Profile Generic class (ClassID7) (see pag. 10):

1-0:96.1.0(15)(1-0.1.8.1)(1-0:1.8.2)(200101044500W)(2000*kWh)(200*kWh)(200101043000W)(1900*kWh)(190*kWh)(200101041500W)(1800*kWh)(180*kWh)…….(200101011500W)(600*kWh)(60*kWh)

		Buffer of 1-0:96.1.0.255			
		Clock	AMR-status	Value 1	Value 2
		0-0:1.0.0.255	0-0:96.10.1.255	1-0:1.8.1.255	1-0:1.8.2.255
Entries	1	1/01/2020 4:45	0x08	2000	200
	2	1/01/2020 4:30	0x08	1900	190
	3	1/01/2020 4:15	0x08	1800	180
	4	1/01/2020 4:00	0x08	1700	170
	5	1/01/2020 3:45	0x08	1600	160
	6	1/01/2020 3:30	0x08	1500	150
	7	1/01/2020 3:15	0x08	1400	140
	8	1/01/2020 3:00	0x08	1300	130
	9	1/01/2020 2:45	0x08	1200	120
	10	1/01/2020 2:30	0x08	1100	110
	11	1/01/2020 2:15	0x08	1000	100
	12	1/01/2020 2:00	0x08	900	90
	13	1/01/2020 1:45	0x08	800	80
	14	1/01/2020 1:30	0x08	700	70
	15	1/01/2020 1:15	0x08	600	60
	16	1/01/2020 1:00	0x08	500	50
	17	1/01/2020 0:45	0x08	400	40
	18	1/01/2020 0:30	0x08	300	30
	19	1/01/2020 0:15	0x08	200	20
	20	1/01/2020 0:00	0x08	100	10

Figure 4 Example buffer content of Profile Generic class (ClassID7)

In subsection 6.12 of 'DSMR-P1', all possible data objects are listed that can appear on the Belgian P1 interface. Additional to these objects, the following objects will be supported by the Belgian P1 interface:

Medium	Value	OBIS reference	Attribute	Class ID	Value Format (payload)	Value Unit
General	Version information	0-0:96.1.4*255 (see note 4)	2 (Value)	1 (Data)	S4, tag 9	
	Consumer message code	0-0:96.13.1*255	2 (Value)	1 (Data)	Sn (n=0..128), tag 9	
E	Grid config.	1-0:94.32.1.255 (see note 6)	2 (Value)	1 (data)	F3(0,0) tag 6	
	Breaker state	0-0:96.3.10*255	3 (control state)	70 (Disconnector control)	I1, tag 22	
	Limiter threshold	0-0:17.0.0*255	3 (Threshold active)	71 (Limiter)	F5(3,3), tag 18	kW
	Fuse supervision threshold (L1)	1-0:31.4.0*255 (see note 3)	2 (Thresholds)	21 (Register Monitor)	F5(2,2), tag 18	A
	Virtual relay n state	0-n:96.3.10.255 (see note 5)	3 (control state)	70 (Disconnector control)	I1, tag 22	
	Current Average Value A+	1-0:1.4.0.255	2 (current average value)	5 (Demand register)	F5(3,3), tag 6	kW
	Maximum demand – Active energy import of the current month	1-0:1.6.0*255	5 (Capture time)	4 (Extended register)	TST	
			2 (Value)	4 (Extended register)	F5(3,3), tag 6	kW
	Maximum demand – Active energy import of the last 13 months	0-0:98.1.0*255	2 (Buffer) capture obj. 3 {4,1-0:1.6.0.255,5,0}	7 (Profile Generic)	TST	
			2 (Buffer) capture_obj. 4 {4,1-0:1.6.0.255,2,0}	7 (Profile Generic)	F5(3,3), tag 6	kW

Medium	Value	OBIS reference	Attribute	Class ID	Value Format (payload)	Value Unit
	EAN identifier	0-0:96.1.2.255	2 (Value)	1 (Data)	S18, tag 9	
G	EAN identifier	0-n:96.1.2.255 (see note 2)	2 (Value)	1 (Data)	S18, tag 9	
	M-Bus Device ID 2	0-n:96.1.1*255 (see note 2)	2 (Value)	1 (Data)	Sn (n=0..96), tag 9	
	Valve state	0-n:24.4.0*255 (see note 2)	3 (control state)	70 (Discon-nector control)	I1, tag 22	
	Last value of 'not temperature corrected' gas volume in m³, including decimal values and capture time	0-n:24.2.3*255 (see note 2)	5 (Capture time)	4 (Extended register)	TST	
			2 (Value)	4 (Extended register)	F8(2,2)/F8(3,3), tag 18 (see note 1)	m³
W	M-Bus Device ID 2	0-n:96.1.1*255 (see note 2)	2 (Value)	1 (Data)	Sn (n=0..96), tag 9	
	EAN identifier	0-n:96.1.2.255 (see note 2)	2 (Value)	1 (Data)	S18, tag 9	

Table 4 Data object representation

Note 1 For Gas meters with a capacity up to 10 m3/h (G4 and G6), F8(3,3) is applicable. For Gas meters with higher capacities F8(2,2) is applicable.

Note 2 The M-Bus channel number is indicated with 'n' in the OBIS code (for example 0-**n**:24.4.0.255).

Note 3 Only the fuse supervision threshold for phase one is given; but, the same threshold is applicable to phase 2 and 3 in case of a polyphase meter.

Note 4 This OBIS code is used to provide the version number instead of the one specified in 'DSMR-P1', because that one (1-3:0.2.8.255) has a reserved meaning in the IDIS Package 3 specification.

Note 5 The virtual relay number is indicated with 'n' in the OBIS code (for example 0-**n**:96.3.10.255). Today up to 4 virtual relays are foreseen.

Note 6 Provides the grid-configuration for the polyphase meter. In case the meter is connected to a 3x230V grid, the meter is configured in a two-wattmeter setup with L2 as common connection/reference (value = 230). In case the meter is connected to a 3N400V grid, the meter is configured in a three-wattmeter setup (value = 400).

2.3 Data objects

Section 7 of 'DSMR-P1' lists the data objects that are published on the DSMR 'P1 port'. **This list is not valid for the Belgian P1 interface**.

In Belgium – instead of applying section 7 of 'DSMR-P1' – a selection of the published data objects is done using subsection 6.12 of 'DSMR-P1' and Table 4 Data object representation (see pag. 12) of this document.

'Data objects' as published on the Belgian P1 interface:

- Electricity meter related data objects,
  see Table 5 Published electricity meter content (on pag. 14);
- Gas meter related data objects for the coupled gas meters,
  see Table 6 Published gas meter content (on pag. 15);
- Water meter related data objects for the coupled water meters,
  see Table 7 Published water meter content (on pag. 16);
- Other submeter types are out of scope, for now; introduction of new submeter types will come together with a new version of eMUCs-P1 or as an addendum.

Value	OBIS reference	Remarks
Version Information	0-0:96.1.4*255	Encoded as XXXYY, where XXX is the 'DSMR-P1' version number and YY the first two digits of the version of the e-MUCs – P1 specification. Example: 50221
Grid configuration	1-0:94.32.1.255	"230" for 3x230V grid configuration "400" for 3N400V grid configuration
Equipment identifier	0-0:96.1.1*255	ASCII encoded equipment identifier according to DIN 43863-5
EAN identifier E-meter	0-0:96.1.2.255 (see note 7)	EAN-code of the electricity installation
Date-time stamp of P1 message	0-0:1.0.0*255	Encoded as YYMMDDhhmmssX where X is S = summer, W = winter
Meter Reading electricity delivered to client (Tariff 1)	1-0:1.8.1*255 (see note 2, 3)	
Meter Reading electricity delivered to client (Tariff 2)	1-0:1.8.2*255 (see note 2, 3)	
Meter Reading electricity delivered by client (Tariff 1)	1-0:2.8.1*255 (see note 2, 3)	
Meter Reading electricity delivered by client (Tariff 2)	1-0:2.8.2*255 (see note 2, 3)	
Tariff indicator	0-0:96.14.0*255 (see note 2, 3)	(1) = High (2) = low
Current Average Value A+	1-0:1.4.0*255	
Maximum demand – Active energy import of the current month	1-0:1.6.0*255	
Maximum demand – Active energy import of the last 13 months	0-0:98.1.0*255 (1-0:1.6.0*255 ,5) (1-0:1.6.0*255, 2)	Last 13 months of the maximum demand register (Time of appearance & Value)
Actual electricity power delivered to client (+P)	1-0:1.7.0*255	

Value	OBIS reference	Remarks
	(see note 3)	
Actual electricity power received by client (-P)	1-0:2.7.0*255 (see note 3)	
Instantaneous active power L1 (+P)	1-0:21.7.0.255 (see note 6)	
Instantaneous active power L2 (+P)	1-0:41.7.0.255 (see note 5)	
Instantaneous active power L3 (+P)	1-0:61.7.0.255 (see note 6)	
Instantaneous active power L1 (-P)	1-0:22.7.0.255 (see note 6)	
Instantaneous active power L2 (-P)	1-0:42.7.0.255 (see note 5)	
Instantaneous active power L3 (-P)	1-0:62.7.0.255 (see note 6)	
Instantaneous voltage L1	1-0:32.7.0*255	
Instantaneous voltage L2	1-0:52.7.0*255 (see note 5)	
Instantaneous voltage L3	1-0:72.7.0*255	
Instantaneous current L1	1-0:31.7.0*255 (see note 4)	
Instantaneous current L2	1-0:51.7.0*255 (see note 4)	
Instantaneous current L3	1-0:71.7.0*255 (see note 4)	
Breaker state	0-0:96.3.10*255	(0) = Disconnected (1) = Connected (2) = Ready for reconnection
Limiter threshold	0-0:17.0.0*255	0-99,998 = threshold 99,999 = deactivated
Fuse supervision threshold	1-0:31.4.0*255	0-999,98 = threshold 999,99 = deactivated
virtual relay 1 - state	0-1:96.3.10.255	(0) = Disconnected (1) = Connected
virtual relay 2 - state	0-2:96.3.10.255	(0) = Disconnected (1) = Connected
virtual relay 3 - state	0-3:96.3.10.255	(0) = Disconnected (1) = Connected
virtual relay 4 - state	0-4:96.3.10.255	(0) = Disconnected (1) = Connected
Text message	0-0:96.13.0*255	For future use (empty)

Table 5 Published electricity meter content

Note 1 Be aware of the fact that the number of OBIS codes and the order of the OBIS codes in the messages is not fixed. The customer application must be able to interpret the OBIS codes and to understand the representation.

Note 2 'DSMR-P1' mentions that " 'Tariff code 1' is used for low tariff and 'Tariff code 2' is used for high tariff.", **which is not valid in Belgium**.
Currently in Belgium 'Tariff code 1' is generally used for normal tariff and 'Tariff code 2' for low tariff. In general, assignment of tariffs to the tariff codes depends on the contract of the customer. Therefore, it is advised to indicate the registers by their tariff number in the external application instead of a fixed assignment to High or Low.

Note 3 When there is simultaneous power consumption in one phase and power injection in another phase, the meter determines the net value (= algebraic sum of the energy in the 3 phases) and stores it in the appropriate single register (1.x.0 or 2.x.0).

Note 4 In deviation from 'DSMR-P1', the resolution for the instantaneous currents (1-0:x1.7.0*255 where x =3, 5, 7) is improved from F3(0,0) to F5 (2,2).

Note 5 In case the polyphase meter is connected to a 3x230V grid, the value is 0. In a 3x230V grid, the meter sensors are configured in a two-wattmeter setup for power measurement (Aron connection). L2 is the common connection/reference.

Note 6 In case the polyphase meter is connected to a 3x230V grid, the power of L1 and L2 shall be the result of the power measurement by the meter configured in a two-wattmeter setup for power measurement (Aron connection).

Note 7 In case the value of the EAN-identifier field is left blank, the linked installation has no EAN value or the process to show the EAN-identifier is not supported by the DSO.

Value	OBIS reference	Remarks
Device type	0-n:24.1.0*255 (see note 1)	Device type 'Code', as specified in OMS 4.2.1 table 2.
Equipment identifier	0-n:96.1.1*255 (see note 1)	ASCII encoded equipment identifier according to DIN 43863-5
EAN-identifier submeters	0-n:96.1.2.255 (see note 1, 3)	EAN-code of the gas installation
Valve state	0-n:24.4.0*255 (see note 1)	(0) = Disconnected (1) = Connected (2) = Ready for reconnection
Last value of 'not temperature corrected' gas volume in m³, including decimal values and capture time	0-n:24.2.3*255 (see note 1, 2)	timestamp of last M-Bus communication followed by the volume at that moment

Table 6 Published gas meter content

Note 1 The M-Bus channel number is indicated with 'n' in the OBIS code.

Note 2 Be aware that for the gas volume, another OBIS-code is published than the one listed in section 7 of 'DSMR-P1. This is due to the fact that in Belgium the 'not-temperature corrected' gas volume is used while in the Netherlands, the 'temperature corrected' gas volume is used.

Note 3 In case the value of the EAN-identifier field is left blank, the linked installation has no EAN value or the process to show the EAN-identifier is not supported by the DSO.

Value	OBIS reference	Remarks
Device type	0-n:24.1.0*255 (see note 1)	Device type 'Code', as specified in OMS 4.2.1 table 2.
Equipment identifier	0-n:96.1.1*255 (see note 1)	ASCII encoded equipment identifier according to DIN 43863-5
EAN-identifier submeters	0-n:96.1.2.255 (see note 1, 2)	EAN-code of the Water installation
Last 5-minute water meter Reading including decimal values and capture time	0-n:24.2.1*255 (see note 1, 2)	timestamp of last M-Bus communication followed by the volume at that moment

Table 7 Published water meter content

Note 1 The M-Bus channel number is indicated with 'n' in the OBIS code.

Note 2 In case the value of the EAN-identifier field is left blank, the linked installation has no EAN value or the process to show the EAN-identifier is not supported by the DSO.

Definitions and Abbreviations

Abbreviation/Term	Meaning and Definition
Legal terms	See the 'overarching specifications' document for the references to the following legally defined terms; • contracting authority {N: aanbesteder} • contractor {N: opdrachtnemer; syn: supplier} • offer {N: offerte} • public contract {N: overheidsopdracht} • procurement document {N: opdrachtdocument} • technical specification {N: technische specificatie} • tender {N: plaatsing} • tenderer {N: inschrijver}
AMM	**Automatic Meter Management**
ASCII	**American Standard Code for Information Interchange**
assignment	The assignment in the technical specifications document fits in a public contract related to the execution of works, the delivery of products or the provision of services by a contractor (formerly the tenderer) under the supervision of the customer (formerly the contracting authority). {N: opdracht}
CEMS	**Consumer Energy Management System**
customer	See the 'overarching specifications' document, for the exact meaning of this term indicating Fluvius System Operator and/or possibly other operators who, as 'contracting authority', awarded the contract and subsequently supervises the execution of the assignment. {N: opdrachtgever, klant}
DIN	**Deutsches Institut für Normung** German institute for standardisation
digital meter	Meter (Electricity, Gas, Water, Heat, Pulse meter) with additional functionalities; for example load profiles, TOU switching, disconnection & reconnection, event logging, remote communication.
DLMS	**Device Language Message Specification**
DSMR	**Dutch Smart Meter Requirements**
DSO	**Distribution System Operator**
eMUCS	**Extended Multi-Utility Companion Specification**
EAN	**European Article Numbering**
energy measurement value	A register value indicating the cumulated energy consumption (electricity in kWh, gas in m^3). {N: meterstand, index}
HES	**Head End System** The software platform(s) used for managing operations and maintenance of smart meters.
IDIS	**Interoperable Device Interface Specifications** Industry association

Abbreviation/Term	Meaning and Definition
load profile	An ordered buffer of metering data; for example, records of 'energy measurement values with timestamp'.
M-Bus	**Meter Bus**
OBIS	**OBject Identification System**
OMS	**Open Metering System**
overarching specifications	This is the general name for the main document of this tender – with name FLU20IT017 BALB – prepared by the Fluvius purchase department(s) of the contracting authority. {N: overkoepelend lastenboek}
register	The part of the meter which enables the measured value to be determined (see EN 50470-1 definition 3.2.14).
specification frame	This is a possible table in this and other specification documents, consisting of two columns with in the left field of the first row the label 'TagNr.' and in the right field the identification number (consisting of the paragraph number, followed by hyphen and a sequential number). {N: specificatieframe}
technical prescriptions	This document is called the 'technical prescriptions', containing technical prescriptions in the context of the 'overarching specifications' document. {N: technische voorschriften (TVS)}
technical specifications	The overarching document of this document is called the 'technical specifications', containing technical specifications in the context of the 'overarching specifications' document. {N: technisch lastenboek (TLB)}
timestamp	A timestamp is used to indicate a moment in time. In order to be useful, the timestamp shall include the date as well as the time. The time in a timestamp shall be specified including hours, minutes and seconds.
TOU	**Time Of Use** Time-of-use is a rate plan in which rates vary according to the time of day, season, and day type (weekday or weekend/holiday). Higher rates are charged during the peak demand hours and lower rates during off-peak (low) demand hours.

Table 8 Definitions and Abbreviations

Appendices

A – References

The 'reference lists' in this appendix are purely indicative. They only provide an overview of the standards, regulations and rules that may apply to this document.

A.1 – Standards and Regulations

Identification	Title	Author	Version
DIN 43863-5	Identification number for measuring devices applying for all manufacturers	DIN	2012-04
DSMR-P1	Dutch Smart Meter Requirements (DSMR) for the P1 port	Netbeheer Nederland	Ed. 5.0.2
IDIS Package 3	IDIS Package 3, IP Profile X (extended functionality) IDIS Package 3, Smart Metering Objects	IDIS Association	Edition 1.0
OMS Volume 2	Open Metering System Specification, Generation 4, Volume 2 - Primary Communication.	OMS Group	Version 4.2.1

Table 9 List of Standards and Regulations

A.2 – Customer Regulations

All eMUCS documents are technical prescriptions prepared by the customer.

Identification	Title	Author
eMUCs-GUI-E	extended Multi-Utility Companion Specification of the Graphical User Interface for the Electricity meter	Fluvius
eMUCs-GUI-G	extended Multi-Utility Companion Specification of the Graphical User Interface for the Gas meter	Fluvius
eMUCS-M_{DLMS}	extended Multi-Utility Companion Specification of the I3 Interface (between electricity meter and HES)	Fluvius
eMUCS-M_{MBUS}-G	extended Multi-Utility Companion Specification of the I2 interface for Gas meters (with an electricity meter)	Fluvius
eMUCS-M_{MBUS}-W	extended Multi-Utility Companion Specification of the I2 interface for Water meters (with an electricity meter)	Fluvius
eMUCs-P1	extended Multi-Utility Companion Specification of the P1 consumer interface	Fluvius
eMUCs-S1	extended Multi-Utility Companion Specification of the S1 consumer interface	Fluvius

Table 10 List of Customer Regulations

B – Example telegrams

B.1 – 1-phase meter (with Gas meter on CH1 and Water meter on CH2)

```
/FLU5\253770234_A

0-0:96.1.4(50220)
0-0:96.1.1(3153414731313030303030323331)
0-0:96.1.2(5414400123456789OO)
0-0:1.0.0(200512145552S)
1-0:1.8.1(000000.915*kWh)
1-0:1.8.2(000001.955*kWh)
1-0:2.8.1(000000.000*kWh)
1-0:2.8.2(000000.030*kWh)
0-0:96.14.0(0001)
1-0:1.4.0(02.351*kW)
1-0:1.6.0(200509134558S)(02.589*kW)
0-
0:98.1.0(3)(1-0:1.6.0)(1-0:1.6.0)(200501000000S)(200423192538S)(03.695*kW)(
200401000000S)(200305122139S)(05.980*kW)(200301000000S)(200210035421W)(04.3
18*kW)
1-0:1.7.0(00.000*kW)
1-0:2.7.0(00.000*kW)
1-0:21.7.0(00.000*kW)
1-0:22.7.0(00.000*kW)
1-0:32.7.0(234.6*V)
1-0:31.7.0(000.00*A)
0-0:96.3.10(1)
0-0:17.0.0(99.999*kW)
1-0:31.4.0(999.99*A)
0-1:96.3.10(0)
0-2:96.3.10(0)
0-3:96.3.10(0)
0-4:96.3.10(0)
0-0:96.13.0()
0-1:24.1.0(003)
0-1:96.1.1(37464C4F32313139303333373333)
0-1:96.1.2(5414400123456789OO)
0-1:24.4.0(1)
0-1:24.2.3(200512134558S)(00112.384*m3)
0-2:24.1.0(007)
0-2:96.1.1(3853414731323334353637383930)
0-2:96.1.2(5414400123456789O3)
0-2:24.2.3(200512134558S)(00872.234*m3)

!XXX
```

B.2 – 3-phase meter (with Gas meter on CH1 and Water meter on CH2)

```
/FLU5\253769484_A

0-0:96.1.4(50220)
1-0:94.32.1(400)
0-0:96.1.1(3153414733313031303231363035)
0-0:96.1.2(5414400123456789OO)
0-0:1.0.0(200512135409S)
1-0:1.8.1(000000.034*kWh)
1-0:1.8.2(000015.758*kWh)
1-0:2.8.1(000000.000*kWh)
1-0:2.8.2(000000.011*kWh)
0-0:96.14.0(0001)
1-0:1.4.0(02.351*kW)
1-0:1.6.0(200509134558S)(02.589*kW)
0-0:98.1.0(3)(1-0:1.6.0)(1-0:1.6.0)(200501000000S)(200423192538S)(03.695*kW
)(200401000000S)(200305122139S)(05.980*kW)(200301000000S)(200210035421W)(04
.318*kW)
1-0:1.7.0(00.000*kW)
1-0:2.7.0(00.000*kW)
1-0:21.7.0(00.000*kW)
1-0:41.7.0(00.000*kW)
1-0:61.7.0(00.000*kW)
1-0:22.7.0(00.000*kW)
1-0:42.7.0(00.000*kW)
1-0:62.7.0(00.000*kW)
1-0:32.7.0(234.7*V)
1-0:52.7.0(234.7*V)
1-0:72.7.0(234.7*V)
1-0:31.7.0(000.00*A)
1-0:51.7.0(000.00*A)
1-0:71.7.0(000.00*A)
0-0:96.3.10(1)
0-0:17.0.0(99.999*kW)
1-0:31.4.0(999.99*A)
0-1:96.3.10(0)
0-2:96.3.10(0)
0-3:96.3.10(0)
0-4:96.3.10(0)
0-0:96.13.0()
0-1:24.1.0(003)
0-1:96.1.1(37464C4F323131393033333373333)
0-1:96.1.2(5414400123456789OO)
0-1:24.4.0(1)
0-1:24.2.3(200512134558S)(00112.384*m3)
0-2:24.1.0(007)
0-2:96.1.1(3853414731323334353637383930)
0-2:96.1.2(5414400123456789O3)
0-2:24.2.3(200512134558S)(00872.234*m3)

!XXX
```