

Installation and User's Guide for the attachable TMP-A M-Bus module for ELSTER Water Meters



Valid from M-Bus generation: \$02



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1 Description of Functions

The TMP-A enables the readout of ELSTER water meters in a M-Bus system. The attachment is fitted onto the relevant water meter prepared for this purpose. The volume pulses are added to a volume meter reading by TMP-A.

After adjusting the parameters of the meter reading via the M-Bus, the TMP-A transmits the exact meter reading that the water meter displays on its counter. The free programme MBCONF is used to set parameters. MBCONF is very easy to use due to its user interface.

Another feature of the TMP-A is its due date function. The user can programme an annual due date. The current meter reading is then saved separately at 24:00 (new day on the due date) on the date configured, via the integrated real time clock containing a calendar function. The due date can be changed later without losing the due date meter reading valid so far. In addition, the so-called freeze command enables an immediate initiation of the due date function of an M-Bus master. By giving the freeze command to all pulse adapters in an M-Bus system, the master software can then readout simultaneous consumption values to create load profiles.

The TMP-A is supplied with power by the M-Bus when operated via it. An inbuilt battery ensures meter operation, even in the case of a long-term failure of the M-Bus. The battery is active at delivery.

All configuration data is saved in an EEPROM. In addition, meter readings are logged in the EEPROM each day at midnight. Should a complete failure of the TMP-A occur (M-Bus off and battery empty), then the data of the last backup will be available after restarting the TMP-A.

The TMP-A can be used for meters with a 7 digit or 8 digit counter, as the internal overflow can be programmed to fit.

From generation 2 on up the TMP-A saves the meter reading in the EEPROM on the first day of the month at 24:00. The last 15 months are stored in the rolling memory. These values have a time stamp and can be readout in addition to the data in the M-Bus log so far. The TMP-A offers two different messages for the use to select from: The long message contains all values, including the monthly values. The short message is compatible with generation 1 of the TMP-A, and does not contain monthly values. Even if short messaging is selected, the monthly values are stored internally and can be readout later after changing the message.

2 Installation and Initiation

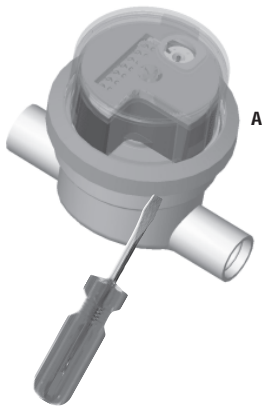
2.1 Mounting the TMP-A

The M-Bus module can be used with the following water meters that have been prepared for remote readout:

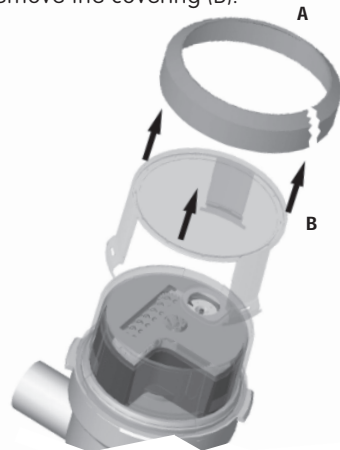
- M140 MO-A and M140 MOZ-A
- S100 EV-A

Sequence of Assembly

1. Break the sealing ring (A).



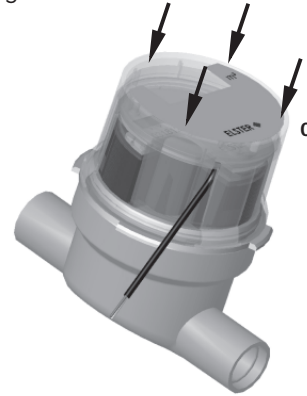
2. Remove the covering (B).



3. Separate the cable entry.

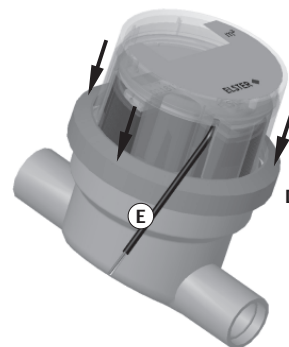


4. Quickly mount the TMP-A module (C). The battery case will immerse into the opening of the water meter when doing so. The three claw fasteners need to snap into their intended notches on the meter with an audible click. Feed the cable through the provided opening.



5. Now attach the sealing ring (D) to the installed unit using force. The sealing ring with its flukes needs to snap in on the entire circumference of the water meter.

Use the appropriate installation wrench to do so (order no.: 0721387). Sealing is only complete once all flukes have fully snapped in.



2.2 Connecting

The TMP-A is provided with an attached, 2-core, 1m long M-Bus cable.

The cable has an external diameter of 3.7mm and is a LiYY 2 x 0.25 mm² type. The cable ends have been provided with insulated ferrules for better manageability. You can bring about the connection to the M-Bus system with suitable junction clamps, for instance. The polarity of the M-Bus voltage is of no consequence.

3 Assigning parameters using MBCONF

The configuration of the device needs to be adapted to the relevant meter by the customer. To do so, please use the programme MBCONF, version 2.5 or higher.

3.1 Installation

The MBCONF software for adjusting parameters of the pulse adapter is a 32Bit application that can be executed on an IBM compatible PC using the operating systems Windows NT, 2000 or XP. The desktop PC or laptop used needs to provide a free serial RS232C or USB interface. An M-Bus level converter is connected to it. The TMP-A that is to be set up needs to be connected to the M-Bus output of the level converter in a 1:1 connection (i.e. as the sole M-Bus device).

To install the software, please start the file „MBCONF_SETUP.EXE“ from Windows Explorer or via „Start – Run“. You will then be able to select the language for the installation programme. A programme group and a link on the desktop are created upon request. Both language versions, German and English, can then be started from either the start menu or directly from the desktop.

3.2 Operation

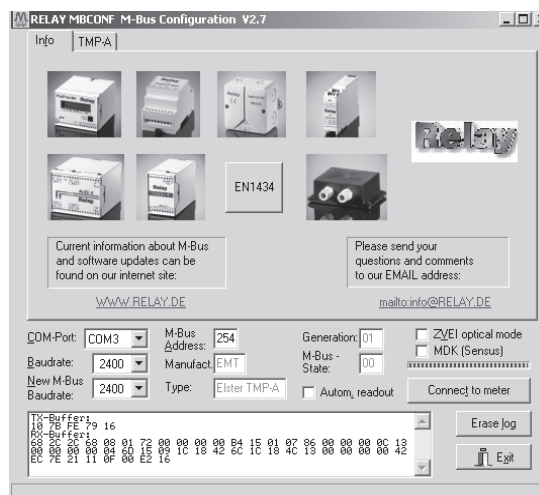
Once the programme has started, it can be operated using a mouse or keyboard according to Windows conventions. If you mouse over a button or input field, a message will appear describing its function. Light grey fields and boxes cannot be edited.

Each input field or button has one underlined letter. You can activate the function by pressing the keys [ALT] and the relevant letter at the same time. The cursor can be moved back and forth in dialogues using the keys [TAB] or [SHIFT][TAB]. [SPACE] activates and deactivates selection fields. Multiple selections (arrow at the edge to the right) can be activated with []. The selection is then made with [] and []. The selection is confirmed with [RETURN]. [ESC] exits the selection without saving changes.

The programme interface is designed like an index card system. The index card „Info“ contains all general settings for initiating communication with the M-Bus device for which the parameters are to be set. Here you can, for example, set the PC's COM Port, the PC's baud rate, the baud rate of the M-Bus device and the M-Bus primary addresses used for communication.

After successfully establishing a connection to the M-Bus device, additional manufacturer's information and additional device-specific index cards are displayed in the index card „Info“.

3.3 Info Index Card



This index card displays several photos of the supported M-Bus devices. The lower third is likewise visible in every other card. Here, the following entry fields and buttons are always accessible:

COM-Port

specifies the serial interface of the configuring computer to which the M-Bus level converter is connected. The port is stored in the programme's INI file so that no further configuration is required when restarting the programme.

Baud Rate

specifies the interface speed of the configuring computer. It can be 300, 2400 or 9600 baud and corresponds to the M-Bus baud rate currently in use. Caution, not all M-Bus level converters available on the market support baud rates exceeding 2400 baud! The configured baud rate needs to correspond to the baud rate of the M-Bus device (see also: New Baud Rate). The TMP-A supports baud rates 300, 2400 and 9600 baud without automatic detection, i.e. the baud rate is pre-programmed.

New M-Bus Baud Rate

enables one to change the baud rate of the M-Bus device. The new baud rate is to be set in the corresponding selection field for this purpose. The module is then informed of the new baud rate via the M-Bus. Once the TMP-A has understood this command, it acknowledges with the individual character „\$E5“ (\$ for hexadecimal syntax) using the old baud rate. Only then does it switch to the new baud rate.

M-Bus Address

is the M-Bus primary address of the connected M-Bus device. The broadcast address 254 can be used in a 1:1 connection (1 adapter connected to the M-Bus). Each M-Bus terminal must respond to the address 254. The default when the programme starts is 254.

Connection to the Meter

serves to request data from the M-Bus terminal with an automatic detection of the device type. The fields „Manufacturer“, „Generation“, „Model“ and „M-Bus Status Byte“ are updated with the data read. New index cards are created afterwards, depending on manufacturer and model of the M-Bus device.

Manufacturer

is a field that displays the 3-digit M-Bus manufacturer code (ASCII capitals) after successful reading („Connection to the Meter“). The field cannot be edited (read only).

Generation

displays the software version of the firmware of the connected M-Bus module. The field cannot be edited (read only).

TMP-A:

Gen = 01: old version of the TMP-A without monthly values

Gen = 02: new version of the TMP-A with monthly values

Model

displays the model (in this case: TMP-A) of the connected device. The field cannot be edited (read only).

Status

displays the M-Bus status of the connected device. The field cannot be edited (read only).

Autom. reading

if this switch is activated then the programme imports the values of the device automatically after each writing.

Log Window

The so-called log window is always visible. All messages of M-bus communication are logged in this window. Data is displayed hexadecimal. It is possible to mark output in the log window and to copy it to the clipboard pressing the keys „CTRL-C“.

From there they can be easily transferred to a word processor for documentation. No further data is entered once the maximum storage capacity of the window has been reached. You will need to delete the data present if you wish to continue logging.

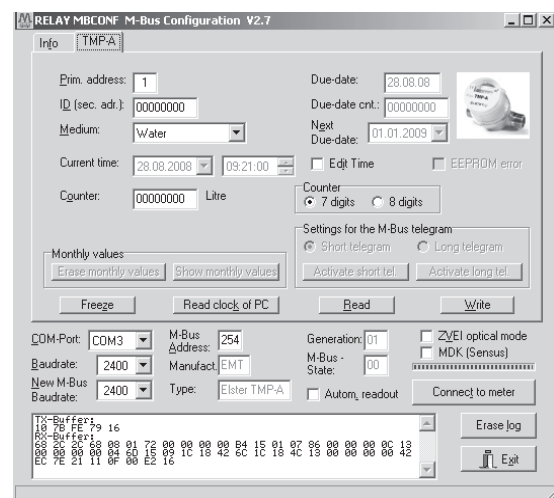
The following buttons are likewise always visible.

Delete log

deletes all output in the log window.

Exit

terminates the programme and writes the current settings for the selection of the serial interface in the INI file.

3.3 TMP-A Index Card

This index card shows the current settings and values of the TMP-A. The parameters of the device can be changed via the following input fields and buttons:

Primary Address

is the M-Bus address of the TMP-A. A value between 0 and 250 can be entered in this field when newly assigning the primary address. Only after activating the button „Write“ is the TMP-A informed of the primary address and other editable settings of this index card.

ID (Sec. addr.)

is the 8-digit M-Bus ID that is also used for secondary addressing of the TMP-A. The serial number of the TMP-A is entered here as a factory preset, and is also printed on the label on the battery bag. We recommend that you programme the serial number of the connected water meter here.

Medium

describes the Medium to be measured by the selected TMP-A.
Selection: water, hot water, cold water, cold / hot water.

Meter reading

is the accumulated meter reading in litres. The meter reading can be programmed with the connected meter to synchronise the pulse adapter. The range goes from 0 to 9999999 (7 digit) and 99999999 (8 digit).

Current Time

is the current date and time of the meter's internal clock in the format DD.MM.YY_hh.mm. This field may only be edited and changed in the TMP-A if the switch „Change / Write Time“ is activated. The button „Import PC Clock“ makes a one-time transfer of the current time of the PC to this window. By clicking on the arrow behind the date input field, a calendar opens for easy selection of the date.

Due Date

is the last due date (date of the latest saving of the due date value) in the format DD.MM.YY. The field cannot be edited (read only).

Due Date Value

is the meter reading saved on the above mentioned date. The field cannot be edited (read only).

Next Due Date

is the next due date (date of the next saving of the due date value) in the format DD.MM.YY.

Saving occurs at 24:00 of the due date, e.g. on the next due date 01/01 when changing from 21/12 23:59 to 01/01 24:00. The field may only be edited and programmed in the TMP-A if the switch „Change / Write Time“ is activated. Here, too, a click on the arrow opens the calendar.

7 Digit / 8 Digit Meter Reading:

selects a 7 or 8 digit counter. The TMP-A then sets the meter reading overflow to 0 according to the selection.

EEPROM Error

is marked if an error has occurred while reading the captive memory. It is absolutely necessary to set parameters!!

Change / Write Time

by activating this check box, you can edit and programme the „Current Time“ and the „Next Due Date“. After successfully setting the parameters using „Write“, the switch is deactivated again.

Log

displays the message set in TMP-A from generation \$02 on up.

Activate Short Message

switches the M-Bus log of the TMP-A from generation \$02 on up to short messages (without monthly values) without writing all other parameters.

Activate Long Message

switches the M-Bus log of the TMP-A from generation \$02 on up to long messages (with monthly values) without writing all other parameters.

Delete Monthly Values

deletes all monthly values in the TMP-A from generation \$02 on up, i.e. every month's date and every monthly meter reading is overwritten 00.00.00 and 00000000 respectively.

Display Monthly Values

displays all stored monthly values in a pop-up window for the TMP-A from generation \$02 on up. The button is only activated if the long message has been selected in the TMP-A.

Freeze

sends a command to the TMP-A to freeze the meter reading. The TMP-A then copies its current meter reading into the due date value and the current date into the due date. This behaviour corresponds to the behaviour on the due date. All TMP-As of an entire Bus system can be requested to simultaneously save the meter readings by this command (broadcast address 255). Afterwards, the master can readout all meters, one after another, without time pressure (load profile).

Import PC Clock

imports the current date and time from the PC and enters this data in the input field „Current Time“.

Read

updates the M-Bus data on the selected index card. The non-modifiable data are updated, too.

Write

transmits the current settings to the device, where they are saved in an EEPROM. It is recommended to check the parameters set by reading afterwards.

Note

When connecting a new device, you first need to activate the button „Connection to Meter“. Afterwards the index card is updated accordingly.

4 M-Bus Messages

TMP-A generation 02 RSP_UD short telegram with sample values (TMPA → Master).

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	2C	Length field
3	L	2C	Length field
4	Start	68	Start signal Longframe
5	C	08	Answer with user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	CI	72	Answer with variable data format / LSB primarily
8	Identification number	45	8-digits BCD, here: 70112345 (Serial No. 12345, manufactured in 01/2007)
9		23	
10		11	
11		70	
12	Manufacturer identification	93	3 letters manufacturer code: ELS
13		15	
14	Generation	02	Generation (version) 2 of the TMP-A
15	Medium	06 / 07 / 16 / 17	Hot water or water or cold water or hot and cold water
16	Access meter	02	Access meter (will be advanced after every RSP_UD), here: 02
17	Status	00	Status byte, here: 00 -> no error, bit 3 = 1: EEPROM error
18	Signature	00	no encoding, only for radio M-Bus
19		00	
20	DIF	0C	8 digit BCD data
21	VIF	13	volume in litres
22	Actual volume	67	here: 01234567 litres
23		45	
24		23	
25		01	
26	DIF	04	32 bit binary data
27	VIF	6D	Date and time: data type F (CP32)
28	Actual date/time	3A	here: 06.02.2007 13:58
29		0D	
30		E6	
31		02	
32	DIF	42	16 bit binary data, memory number 1
33	VIF	6C	Date: data type G (CP16)
34	last due data of the year	E1	here: 01.01.2007
35		01	
36	DIF	4C	8 digit BCD , memory number 1
37	VIF	13	volume in litres
38	Volume per last due data of the year	51	here: 00456951 litres
39		69	
40		45	
41		00	
42	DIF	42	16 bit binary data, memory number 1
43	VIF	EC	Date: data type G (CP16)
44	VIFE	7E	future value
45	next due data of the year	01	here: 01.01.2008
46		11	
47	DIF	0F	all following characters are company-specific (up to check summary)
48	PBITS	00	PBITS = 00 : short telegram, 7-digit meter reading
49	CS		Check summary via C-field up to PBITS
50	Stop	16	Stop signal

Pbits:

Bit	7	6	5	4	3	2	1	0
Value (bin)	Long	BCD8	0	0	0	0	0	0

Long: 1 = long telegram activated; 0 = short telegram activated
 BCD8: 1 = 8 digit meter reading; 0 = 7 digit meter reading

TMP-A Generation 02 RSP_UD long telegramm with sample values (TMPA → Master)

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	E0	Length field
3	L	E0	Length field
4	Start	68	Start signal Longframe
5	C	08	Answer with user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	CI	72	Answer with variable data format / LSB primarily
8	Identification number	45	8-digits BCD, here: 70112345 (Serial No. 12345, manufactured in 01/2007)
9		23	
10		11	
11		70	
12	Manufacturer identification	93	3 letters manufacturer code: ELS
13		15	
14	Generation	02	Generation (version) 2 of the TMP-A
15	Medium	06 / 07 / 16 / 17	Hot water or water or cold water or hot and cold water
16	Access meter	02	Access meter (will be advanced after every RSP_UD), here: 02
17	Status	00	Status byte, here: 00 -> no error
18	Signature	00	no encoding, only for radio M-Bus
19		00	
20	DIF	0C	8 digit BCD data
21	VIF	13	volume in litres
22	Actual volume	67	here: 01234567 litres
23		45	
24		23	
25		01	
26	DIF	04	32 bit binary data
27	VIF	6D	Date and time: data type F (CP32)
28	Actual date/time	35	here: 01.04.2008 07:53
29		07	
30		01	
31		14	
32	DIF	42	16 bit binary data, memory number 1
33	VIF	6C	Date: data type G (CP16)
34	last due data of the year	01	here: 01.01.2008
35		11	
36	DIF	4C	8 digit BCD , memory number 1
37	VIF	13	volume in litres
38	Volume per last due data of the year	51	here: 00456951 litres
39		69	
40		45	
41		00	
42	DIF	42	16 bit binary data, memory number 1
43	VIF	EC	Date: data type G (CP16)
44	VIFE	7E	future value
45	next due data of the year	21	here: 01.01.2009
46		11	
47	DIF	82	16 bit binary data
48	DIFE	01	Memory number 2

Nr.	Field	Content Hex.	Note
49	VIF	6C	Date: data type G (CP16)
50	Month 1 – date	01	here: 01.04.2008
51		14	
52	DIF	8C	8 digit BCD data
53	DIFE	01	Memory number 2
54	VIF	13	Date: data type G (CP16)
55	Month 1 – status	79	Meter reading month 1 = 00000279
56		02	
57		00	
58		00	
59	DIF	C2	16 bit binary data
60	DIFE	01	Memory number 3
61	VIF	6C	Date: data type G (CP16)
62	Month 2 – date	01	here: 01.03.2008
63		13	
64	DIF	CC	8 digit BCD data
65	DIFE	01	Memory number 3
66	VIF	13	Date: data type G (CP16)
67	Month 2 – status	67	Meter reading month 2 = 00000267
68		02	
69		00	
70		00	
...	
203	DIF	C2	16 bit binary data
204	DIFE	07	Memory number 15
205	VIF	6C	Date: data type G (CP16)
206	Month 14 – date	01	here: 01.03.2007
207		13	
208	DIF	CC	8 digit BCD data
209	DIFE	07	Memory number 15
210	VIF	13	Date: data type G (CP16)
211	Month 14 – status	12	Meter reading month 15 = 00000112
212		01	
213		00	
214		00	
215	DIF	82	16 bit binary data
216	DIFE	08	Memory number 16
217	VIF	6C	Date: data type G (CP16)
218	Month 15 – date	E1	here: 01.02.2007
219		02	
220	DIF	8C	8 digit BCD data
221	DIFE	08	Memory number 16
222	VIF	13	Date: data type G (CP16)
223	Month 15 – status	99	Meter reading month 16 = 00000099
224		00	
225		00	
226		00	
227	DIF	0F	all following characters are company-specific (up to check summary)
228	PBITS	80	PBITS = 00 : long telegram, 7-digit meter reading
229	CS		Check summary via C-field up to PBITS
230	Stop	16	Stop signal

Byte sequence of the RSP_UD (long telegram with monthly values, sequence: latest month first).

TMP-A generation 02 RSP_UD telegram with sample values (TMPA —> Master)

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	22	Length field
3	L	22	Length field
4	Start	68	Start signal Longframe
5	C	53	Sending user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	Cl	51	Sending data
8	DIF	01	8 bit binary data
9	VIF	7A	Address (primary)
10	Padr	02	New primary address (here: 02)
11	DIF	07	64 bit binary data
12	VIF	79	Volume in litres
13	Identification number	45	8-digits BCD, here: 70112345 (Serial No. 12345, manufactured in 01/2007)
14		23	
15		11	
16		70	
17	Manufacturer identification	93	3 letters manufacturer code: ELS
18		15	
19	Generation	02	Generation (version) 2 of the TMP-A
20	Medium	06 / 07 / 16 / 17	Hot water or water or cold water or hot and cold water
21	DIF	0C	8 digit BCD data
22	VIF	13	volume in litres
23	Actual volume	67	here: 01234567 litres
24		45	
25		23	
26		01	
27	DIF	04	32 bit binary data
28	VIF	6D	Date and time: data type F (CP32)
29	Actual date/time	3A	here: 06.02.2007, 13:58
30		0D	
31		E6	
32		02	
33	DIF	42	16 bit binary data, memory number 1
34	VIF	6C	Date: data type G (CP16)
35	next due data	E1	here: 01.01.2007
36		01	
37	DIF	0F	Rest of data is company-specific
38	PBITS	00	PBITS = C0 : long telegram, 8-digit BCD
39	CS		Check summary via C-field up to PBITS
40	Stop	16	Stop character

The Master can write the primary address, ID, medium, current meter reading, current time with date, next due date and PBITS using the telegram illustrated above. The TMP-A analyses the individual data records by means of the DIF. The sequence of the records may vary therefore. It is also possible to only transmit a part of the SND_UD mentioned above.

TMP-A generation 02 freeze telegram (Master → TMPA)

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	03	Length field
3	L	03	Length field
4	Start	68	Start signal Longframe
5	C	53	Sending user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	CI	54	Freeze
8	CS		Check summary via C-field up to CI-field
9	Stop	16	Stop signal

When receiving this telegram, the TMP-A saves its current meter reading into the due date meter reading and the current date into the last due date (freeze).

TMP-A generation 02 erase telegram (Master → TMPA)

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	06	Length field
3	L	06	Length field
4	Start	68	Start signal Longframe
5	C	53	Sending user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	CI	50	Application reset
8	Sub	08	Installation and restart
9	X0	AA	to protect the command
10	X1	55	to protect the command
11	CS		Check summary via C-field up to X1
12	Stop	16	Stop signal

The TMP-A erases all saved monthly values upon receiving this telegram. The date is set to 00.00.00 for each month and the meter reading is set to 0.

TMP-A generation 02 telegram for switching the baud rate, with an example (Master → TMPA)

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	03	Length field
3	L	03	Length field
4	Start	68	Start signal Longframe
5	C	53	Sending user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	CI	B8	Baud rate: B8: 300 Bd; BB: 2,400 Bd; BD: 9,600 Bd, here: 2,400 Bd
8	CS		Check summary via C-field up to CI
9	Stop	16	Stop signal

The TMP-A is set to an M-Bus baud rate of 2400 by default. This can be changed with the above mentioned M-Bus commands, a possible acknowledge with \$E5 may still be transmitted using the old baud rate.

TMP-A generation 02 telegram switching short (Master —> TMPA)

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	04	Length field
3	L	04	Length field
4	Start	68	Start signal Longframe
5	C	53	Sending user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	CI	50	Application reset
8	Sub	02	Simple billing
9	CS		Check summary via C-field up to Sub
12	Stop	16	Stop signal

The above mentioned telegram is an alternative to switching the message type to short message, i.e. without monthly values. The switching method may also be used in the M-Bus network with the address 255 in order to change all TMP-As installed. The same applies to the following command:

TMP-A generation 02 telegram switching long (Master —> TMPA)

Nr.	Field	Content Hex.	Note
1	Start	68	Start signal Longframe
2	L	04	Length field
3	L	04	Length field
4	Start	68	Start signal Longframe
5	C	53	Sending user data
6	A	01	Primary address, here: 1, possible: 00, 01..FA, FD for secondary addressing
7	CI	50	Application reset
8	Sub	02	Enhanced billing
9	CS		Check summary via C-field up to Sub
12	Stop	16	Stop signal

Example readout of a short telegram

Date	Time	Addr.	ID-No	Manuf.	No	Value	Unit	Description	Type	Module	M.No	Rate
26.01.07	09:10:26	1	70112345	ELS	1	00000306	l	volume	instant.	0	0	0
26.01.07	09:10:26	1	70112345	ELS	2	01.05.08 08:54 Win V		time point	instant.	0	0	0
26.01.07	09:10:26	1	70112345	ELS	3	01.01.08		time point	instant.	0	1	0
26.01.07	09:10:26	1	70112345	ELS	4	00000241	l	volume	instant.	0	1	0
26.01.07	09:10:26	1	70112345	ELS	5	01.01.09		time point future value	instant.	0	1	0

Example readout of a long telegram

Date	Time	Addr.	ID-No	Manuf.	No	Value	Unit	Description	Type	Module	M.No	Rate
26.01.07	09:08:32	1	70112345	ELS	1	00000282	l	volume	instant.	0	0	0
26.01.07	09:08:32	1	70112345	ELS	2	01.04.08 08:53 Win V		time point	instant.	0	0	0
26.01.07	09:08:32	1	70112345	ELS	3	01.01.08		time point	instant.	0	1	0
26.01.07	09:08:32	1	70112345	ELS	4	00000241	l	volume	instant.	0	1	0
26.01.07	09:08:32	1	70112345	ELS	5	01.01.09		time point future value	instant.	0	1	0
26.01.07	09:08:32	1	70112345	ELS	6	01.04.08		time point	instant.	0	2	0
26.01.07	09:08:32	1	70112345	ELS	7	00000279	l	volume	instant.	0	2	0
26.01.07	09:08:32	1	70112345	ELS	8	01.03.08		time point	instant.	0	3	0
26.01.07	09:08:32	1	70112345	ELS	9	00000267	l	volume	instant.	0	3	0
26.01.07	09:08:32	1	70112345	ELS	10	01.02.08		time point	instant.	0	4	0
26.01.07	09:08:32	1	70112345	ELS	11	00000254	l	volume	instant.	0	4	0
26.01.07	09:08:32	1	70112345	ELS	12	01.01.08		time point	instant.	0	5	0
26.01.07	09:08:32	1	70112345	ELS	13	00000241	l	volume	instant.	0	5	0
26.01.07	09:08:32	1	70112345	ELS	14	01.12.07		time point	instant.	0	6	0
26.01.07	09:08:32	1	70112345	ELS	15	00000228	l	volume	instant.	0	6	0
26.01.07	09:08:32	1	70112345	ELS	16	01.11.07		time point	instant.	0	7	0
26.01.07	09:08:32	1	70112345	ELS	17	00000215	l	volume	instant.	0	7	0
26.01.07	09:08:32	1	70112345	ELS	18	01.10.07		time point	instant.	0	8	0
26.01.07	09:08:32	1	70112345	ELS	19	00000202	l	volume	instant.	0	8	0
26.01.07	09:08:32	1	70112345	ELS	20	01.09.07		time point	instant.	0	9	0
26.01.07	09:08:32	1	70112345	ELS	21	00000189	l	volume	instant.	0	9	0
26.01.07	09:08:32	1	70112345	ELS	22	01.08.07		time point	instant.	0	10	0
26.01.07	09:08:32	1	70112345	ELS	23	00000176	l	volume	instant.	0	10	0
26.01.07	09:08:32	1	70112345	ELS	24	01.07.07		time point	instant.	0	10	0
26.01.07	09:08:32	1	70112345	ELS	25	00000163	l	volume	instant.	0	11	0
26.01.07	09:08:32	1	70112345	ELS	26	01.06.07		time point	instant.	0	11	0
26.01.07	09:08:32	1	70112345	ELS	27	00000151	l	volume	instant.	0	12	0
26.01.07	09:08:32	1	70112345	ELS	28	01.05.07		time point	instant.	0	12	0
26.01.07	09:08:32	1	70112345	ELS	29	00000138	l	volume	instant.	0	13	0
26.01.07	09:08:32	1	70112345	ELS	30	01.04.07		time point	instant.	0	13	0
26.01.07	09:08:32	1	70112345	ELS	31	00000125	l	volume	instant.	0	14	0
26.01.07	09:08:32	1	70112345	ELS	32	01.03.07		time point	instant.	0	14	0
26.01.07	09:08:32	1	70112345	ELS	33	00000112	l	volume	instant.	0	15	0
26.01.07	09:08:32	1	70112345	ELS	34	01.02.07		time point	instant.	0	15	0
26.01.07	09:08:32	1	70112345	ELS	35	00000099	l	volume	instant.	0	16	0

5 Technical Specifications

Housing

Installation	onto water meters
Colour	transparent
Protection class	IP54

Ambient conditions

Operating temperature	0 to 55 °C
Storage temperature	-20 to 70 °C
Humidity (not condensing)	10% to 70%

M-bus cable

Cable type	LiYY 2 x 0,25 mm ² with insulated wire end ferrules
Length	1 m

Power consumption

Principle	Remote power supply from the M-Bus with automatic switchover to battery if the Bus fails
Bus operation	max. 1.5 mA (1 standard load), no battery load
Battery	Lithium 3V, 1000mAh
Battery operation	approx. 4 µA or 7 µA at 25 °C if the magnet under the Reed contact stops.
Battery life	typically 10 years at 25 °C battery operation only

M-Bus: Physical data

M-Bus standby current	typically 1.4 mA maximum 1.5 mA (1 standard load)
Space (0-bit) current	Standby current + typical 13 mA
M-Bus interface	TI TSS721 with 2 x 2150hm Protective resistor

M-Bus protocol

Relevant standard	EN1434-3
Transfer rate	300, 2400 and 9600 baud (programmable)
Addressing	Primary and secondary addressing with a wildcard, er input: 1 primary and 1 secondary address
Supported functions	SND_NKE, REQ_UD2, SND_UD, standards conform ignoring of the FCB bit.
Data structure short telegram	has variable structure, low byte first (identifier 72h) Length = 50 bytes 1. Data record: Meter reading 2. Data record: date and time 3. Data record: last due date 4. Data record: last due date value 5. Data record: next due date 6. Data record: company-specific appendix

Data structure long telegram has variable structure,

-
- low byte first
(identifier 72h)
Length = 50 bytes
1. Data record:
Meter reading

 2. Data record:
date and time

 3. Data record:
last due date

 4. Data record:
last due date value

 5. Data record:
next due date

 6. Data record:
most recent month's
date
(01/MM/YY)

 7. Data record:
most recent month's
meter reading

-
34. Data record:
earliest month's
date
(01/MM/YY)

 35. Data record:
earliest month's
meter reading

 36. Data record:
company-specific
appendix

Parameter protocol	identification number, medium, primary address, Initial meter reading, date / time and next due date are programmable by SND_UD via the M-Bus
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