

Data Protocol integration of Elster Kromschroeder M-Bus

Absolute Encoder Z6

Version 5.X

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2 Content

This document specifies the implementation of the Mbus telegrams for the Elster Absolute Encoder Z6, versions V5.x.

3 Telegram SND_NKE

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'SND_NKE'	test address(0xFE), correct primary address	'E5'	No action.	EN 13757-2:2004: E 5.7.3.1 5.7.7
'SND_NKE'	secondary address(0xFD), Encoder selected	'E5'	Encoder will be deselected	

4 Telegram SND_UD

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'Baud rate set' 300	test address(0xFE), correct primary address or secondary address(0xFD), Encoder selected	'E5'	set baud rate to 300 Baud permanent	EN 13757-2:2004: E 5.2

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'Baud rate set' 2400	test address(0xFE), correct primary address or secondary address(0xFD), Encoder selected	'E5'	set baud rate to 2400 Baud permanent	EN 13757-2:2004: E 5.2

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'Application reset'	test address(0xFE), correct primary address or secondary address(0xFD), Encoder selected	'E5'	No action.	EN 13757-3:2004: E 4.2

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'primary address set'	test address(0xFE), correct primary address or secondary address(0xFD), Encoder selected	'E5'	sets new primary address	EN 13757-3:2004: E 11.5.1

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'Slave select'	secondary address(0xFD) and correct Device ID, Manufacturer, Generation and Medium	'E5'	selects the Encoder	EN 13757-3:2004: E 11.3 11.5.2 11.5.3
'Slave select'	secondary address(0xFD) and wrong Device ID, Manufacturer, Generation or Medium		deselects the Encoder.	

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'wrong CI'	test address(0xFE), correct primary address or secondary address(0xFD), Encoder selected		No Action - CI not in supported CI-Field definition	EN 13757-3:2004: E E.5

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'Service set'	test address	'E5'	sets Encoder into Service Mode	EN 13757-3:2004: E 10 Manufacturer Specific unstructured Data Block

5 Telegram REQ_UD1

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'REQ_UD1'	test address(0xFE), correct primary address or secondary address(0xFD), Encoder selected	'E5'	No Action	EN 13757-2:2004: E 5.7.3.2

6 Telegram REQ_UD2

Encoder Receiving data	Encoder Address	Encoder Sending data	Encoder Action	European Standard
'REQ_UD2'	test address(0xFE), correct primary address or secondary address(0xFD), Encoder selected	RSP-UD Data Record	sends the RSP-UD telegram	EN 13757-2:2004: E 5.7.3.3

7 Telegrams from Master to Encoder

Command – SND_NKE

Field	Hex	Remark
Start	0x10	Start character short frame
C	0x40	Short frame
A	AA	Primary address or 0x253 for secondary addressing
CS	CC	Checksum
Stop	0x16	Stop

Command – SND_UD Baud rate set

Field	Hex	Remark
Start	0x68	Start character long frame
L	0x03	Length
L	0x03	Length
Start	0x68	Start character long frame
C	0x53 / 0x73	Master sent user data to slave
A	AA	Primary address or 0x253 for secondary addressing
CI	0xBB	0xB8 sets Baud rate to 300, 0xBB sets Baud rate to 2400
CS	CC	Checksum
Stop	0x16	Stop

Command – SND_UD Application reset

Field	Hex	Remark
Start	0x68	Start character long frame
L	0x03	Length
L	0x03	Length
Start	0x68	Start character long frame
C	0x53 / 0x73	Master sent user data to slave
A	AA	Primary address or 0x253 for secondary addressing
CI	0x50	Application reset
CS	CC	Checksum
Stop	0x16	Stop

Command – SND_UD primary address set

Field	Hex	Remark
Start	0x68	Start character long frame
L	0x06	Length
L	0x06	Length
Start	0x68	Start character long frame
C	0x53 / 0x73	Master sent user data to slave
A	AA	Primary address
CI	0x51	Data send (master to slave)
DIF	0x01	8 Bit Integer
VIF	0x7A	Primary address set
Primary addressing	AA	New primary address
CS	CC	Checksum
Stop	0x16	Stop

Command – SND_UD Slave select

Field	Hex	Remark
Start	0x68	Start character long frame
L	0x0B	Length
L	0x0B	Length
Start	0x68	Start character long frame
C	0x53 / 0x73	Master sent user data to slave
A	0xFD	Primary address or 0x253 for secondary addressing
CI	0x52	Slave select
ID1-4	ID-1 ID-2 ID-3 ID-4	Identification Number
Manufacturer	0xE6 0x1E	e.g. GWF to IEC 870 Manufacturer ID
Generation	Gen	SW-Version 1-Byte
Medium	0x03 / 0x06 / 0x07	Gas / Water / Hot water
CS	CC	Checksum
Stop	0x16	Stop

Command – SND_UD Service set (The Encoder acknowledges the received data frame with 0xE5 and will quit Mbus mode)

Field	Hex	Remark
Start	0x68	Start character long frame
L	0x06	Length
L	0x06	Length
Start	0x68	Start character long frame
C	0x53 / 0x73	Master sent user data to slave
A	0xFE	Primary test address
CI	0x51	Data send (master to slave)
DIF	0x0F	User defined command
VIF	0x07	SPX command
Command	0x5F	Switch to Service mode
CS	CC	Checksum
Stop	0x16	Stop

Command – REQ_UD1

Field	Hex	Remark
Start	0x10	Start character short frame
C	0x5A / 0x7A	Request user data (alarm sending)
A	AA	Primary address or 0x253 for secondary addressing
CS	CC	Checksum
Stop	0x16	Stop

Command – REQ_UD2

Field	Hex	Remark
Start	0x10	Start character short frame
C	0x5B / 0x7B	Request user data (counter sending)
A	AA	Primary address or 0x253 for secondary addressing
CS	CC	Checksum
Stop	0x16	Stop

8 Telegrams from Encoder to Mbus Master

RSP_UD Data Record

Field	Hex	Remark	
Start	0x68	Start character long frame	
L	0x1D	Length	
L	0x1D	e.g. 0x1D	
Start	0x68	Start character long frame	
C	0x08	▲ Sending "requested data"	
A	0x01	primary address or 0x253 for secondary addressing e.g. 0x01	
CI	0x72	Answer with variable data frame	
Fixed Data Header 12 Byte	Identification Number	0x78	8 Digit BCD e.g. 12345678
		0x56	
		0x34	
		0x12	
	Manufacturer Identification	0xE6	According to IEC 870 e.g. GWF SPX, MEI, ELS, KRO
		0x1E	
	SW-Version	0x33	e.g. V5.1
	Medium	0x03 / 0x07 / 0x06	Gas, Water, Hot water
	Access Number	0x13	Access counter e.g. 19
	Status	0x00 / 0x02	No Error / Any application error
Signature	0x00	Default 0	
	0x00	Default 0	
variable format data	DIF	0x0D	Data format 0x0C, 0x0E 8,12 Digit BCD, 0x0D variable length
	VIF	0x78	Serial number
	LVAR	0x06	Serial number length 0x00 to 0xBF Filed only used for "variable length"
	Serial number	0x43	e.g. 123ABC (variable length)
		0x42	
		0x41	
		0x33	
		0x31	
	DIF	0x0C	Data format 8 Digit BCD
	VIF	0x13 ... 0x17	Multiplier 0,001 m³ ... 10 m³
	Volume	0x21	Value e.g. 07654321
		0x43	
		0x65	
0x07			
CS	CS	▼ Checksum (Checksum starts with "requested data")	
Stop	0x16	Stop	

9 Various

RSP_UD:

V5.0 RSP_UD Protocol is fixed and can't be changed.

V5.1 Starting from version V5.1 the Mbus-Protocol is configurable.

Timing:

Encoder Baud rate 300:

The Encoder timing complies with the norm (see European Standard EN 13757-2:2004 E 5.7.6)

Encoder Baud rate 2400:

The Encoder timing complies with the norm (see European Standard EN 13757-2:2004 E 5.7.6)

Exception: When the internal register figures are being read by the Encoder and the Mbus Master selects the Encoder at the same time – the Mbus Master will not receive an answer.

In order to avoid a timeout with the Mbus Master – the Mbus Master retry delay time should be set to 1000 [ms] between the three required requests.

Mbus Master recommendations:

In case of one or even recurring readout timeouts with the Mbus Master – the Mbus Master should readout the Encoder or other meters during the following readout cycle again.

If the Encoder is set to Mbus 2400 Baud, the answer time can't be kept by reading the register value after receiving the request.

This is why the Encoder reads the register value 2 seconds after every received telegram which starts with 0x10 or 0x68. If there is no action on the Bus, the Encoder reads the register value by a random fast time between 1 and 60 seconds. If after 16 times a reading in the fast mode is not received, the Encoder changes time to slow and reads the register value by a random time interval of between 1 and 60 minutes. If the Encoder detects a telegram which starts with 0x10 or 0x68, the random mode will be set to fast.

Least significant byte:

The Encoder supports only the mode where the least significant byte of a multibyte record is transmitted first.

FCB,FCV:

FCB,FCV Bit not supported

Baud rate:

300/2400 Baud supported, default Baud rate 2400 or depending on order, none Auto speed Mode

Unit Loads: (see **European Standard EN 13757-2:2004: E 4.2.2**)

The Encoder requires a maximum Mark current of 2 Unit loads.