

# HYDROMETER

## IZAR CENTER 60/120/250 MEMORY

## IZAR CENTER 60/120/250



### Technical data sheet

2009-10-28

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# 1 Introduction

This document contains a technical description of the IZARCENTER. The IZARCENTER is a M-Bus Level Converter / Repeater. Internally equipped with a non-volatile Flash-Memory it is also a M-Bus Master. The M-Bus (Meter-Bus) is a low-cost bus system used for automatic reading of consumption measuring devices like water meters, heat meters, electricity meters and more. The M-Bus was developed by Prof. Ziegler of the University of Paderborn (Germany) together with the companies Texas Instruments and Techem. For all meters except electricity meters it has become a European standard. To understand this document you should be familiar with the basic concepts of the M-Bus. Useful are the documents provided on the official M-Bus homepage (<http://www.m-bus.com>), especially "The M-Bus, A Documentation".

## 2 Descriptions

This document uses several M-Bus related terms. The following list gives a small overview and a description for each term.

M-Bus Level Converter	Device, which converts the electrical signals of a RS232 (V.24) PC interface ( <b>Fehler! Verweisquelle konnte nicht gefunden werden.</b> ) into M-Bus signals. Using this device a PC can be connected to a M-Bus network and read-out M-Bus devices. A M-Bus Level Converter is usually an unintelligent device, which does not correct any distortion of the signal like a M-Bus Repeater ( <b>Fehler! Verweisquelle konnte nicht gefunden werden.</b> ). However, even though the IZARCENTER is called a M-Bus Level Converter it always corrects any signal distortion.
M-Bus Repeater	Device, which corrects signal distortion and amplifies the M-Bus signal to feed another M-Bus network. Using Repeater M-Bus networks of almost unlimited size can be build up, since all signals are corrected to be 100% original. M-Bus Repeater usually delay the signal by 1 byte time (time to transmit 1 byte = 8 bits).
M-Bus Master	Device or device combination, which reads out M-Bus devices in a M-Bus network. Since the M-Bus is a hierarchical system, there is exactly one M-Bus Master in a M-Bus system. Only the M-Bus Master is able to initiate communication. The IZAR CENTER MEMORY devices are M-Bus Master, because they can automatically read-out M-Bus devices.
M-Bus Slave	As mentioned before the M-Bus is a hierarchical system. There is one Master, which controls the communication, and one or more devices (usually consumption measuring devices). M-Bus devices are also known as M-Bus Slaves.
RS232	One of the PC data interfaces. Works with electrical voltage levels of -12 .. -3 V and +3V .. +12 V. Data transmission is bit serial with a predefined number of bits per data word. Usually 8 bits (= 1 byte) one start bit and one stop bit are used for one data word. Sometimes a parity bit is also used (parity even or odd). Therefore a data word is 10 or 11 bits in length. The M-Bus always uses 8 data bits, one start bit, one stop bit, and an even parity bit (8E1 = 8 data bits, even parity, 1 stop). 8N1 (8 data bits, no parity, 1 stop) is also very common.
USB	One of the PC data interfaces. Universal serial bus is a common serial bus system to connect a PC and a device.
Ethernet	One of the PC data interfaces. Ethernet is a common frame-based computer

	networking technologie for local area networks.
Modem (AT command set)	Modulator / Demodulator. A device which transmits digital data from a computer over analog phone lines (PSTN), digital phone lines (ISDN) or wireless phone connections (cellular phones, GSM/GPRS). Most modems understand the so-called Hayes AT command set which is used to control the modem's functions.
HYDRO-RADIO	Bi-directional radio system introduced by HYDROMETER.

## 3 Versions and Accessories

The following versions of IZAR CENTER are available.

IZAR CENTER 60	M-Bus Level Converter / Repeater for max. 60 M-Bus devices HYDROMETER part-number: <b>3005777</b>
IZAR CENTER 60 MEMORY	M-Bus Level Converter / Repeater with additional non-volatile Flash memory for max. 60 M-Bus devices HYDROMETER part-number: <b>3005781</b>
IZAR CENTER 120	M-Bus Level Converter / Repeater for max. 120 M-Bus devices HYDROMETER part-number: <b>3005778</b>
IZAR CENTER 120 MEMORY	M-Bus Level Converter / Repeater with additional non-volatile Flash memory for max. 120 M-Bus devices HYDROMETER part-number: <b>3005782</b>
IZAR CENTER 250	M-Bus Level Converter / Repeater for max. 250 M-Bus devices HYDROMETER part-number: <b>3005780</b>
IZAR CENTER 250 MEMORY	M-Bus Level Converter / Repeater with additional non-volatile Flash memory for max. 250 M-Bus devices HYDROMETER part-number: <b>3005783</b>

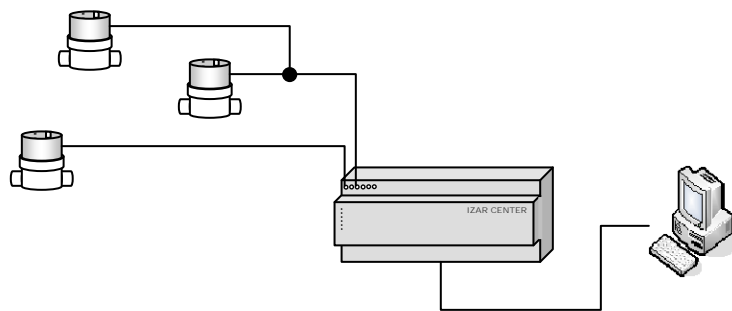
## 4 Applications

Without reconfiguration or reprogramming the IZAR CENTER fits for many purposes. In general one has to decide about two things:

- How many M-Bus devices should be connected to one IZAR CENTER?  
Depending on the number of M-Bus devices select the IZAR CENTER 60, IZAR CENTER 120 or the IZAR CENTER 250.
- Should the IZAR CENTER automatically collect data (data logger) or is it only a M-Bus Level Converter / Repeater?  
Use the IZAR CENTER Memory for automatic data logging/alarming and use the standard IZAR CENTER if the data logger function is not necessary.

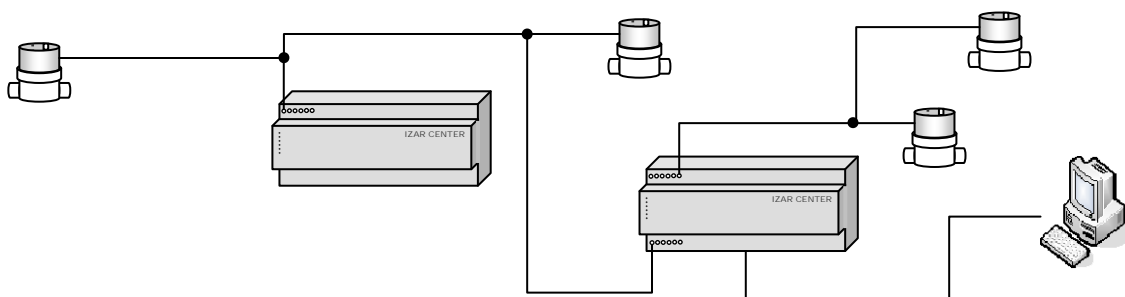
### 4.1 M-Bus Level Converter

Use the IZAR CENTER 60, 120 or 250 without memory option for this application. The PC is connected directly to the PC interface of the IZAR CENTER and reads out the M-Bus devices. You may connect 60,120 or 250 devices maximum.



## 4.2 M-Bus Level Converter and Repeater

If there are more than 250 M-Bus devices in one M-Bus network or if the M-Bus network has got very long lines, then a M-Bus Repeater is used. The IZAR CENTER can be used as Repeater without reconfiguration. Use the IZAR CENTER 60, 120 or 250 without memory option for this application, also.

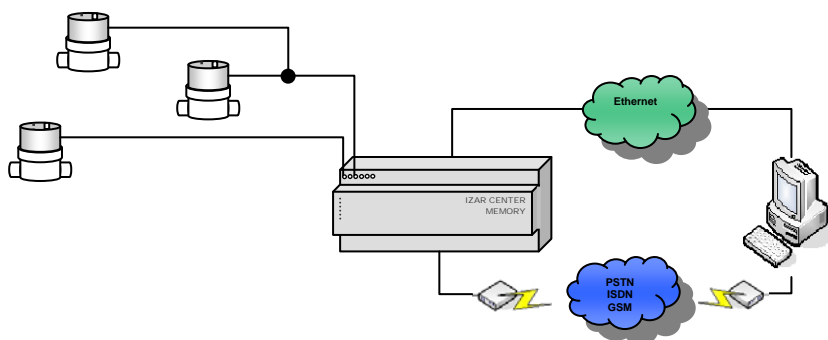


## 4.3 M-Bus Remote Reading

If the M-Bus network is at a remote site you may use the ethernet interface or telephone network (analog (PSTN), digital (ISDN), wireless (GSM/GPRS)) to read out the M-Bus devices. If you only want to collect data of the very moment you are connecting via ethernet or modem (current values, reading date values stored in the M-Bus meter itself) then you can use a IZAR CENTER without memory option.

However, in most cases the IZAR CENTER MEMORY is used since it is able to read out the meters at specific time points and collects the data in its non-volatile flash memory. The collected data are then retrieved at once by making a remote readout or let the IZAR CENTER upload collected data to a FTP server automatically. This is possible either by connecting a special GPRS modem to the IZAR CENTER or using the ethernet interface

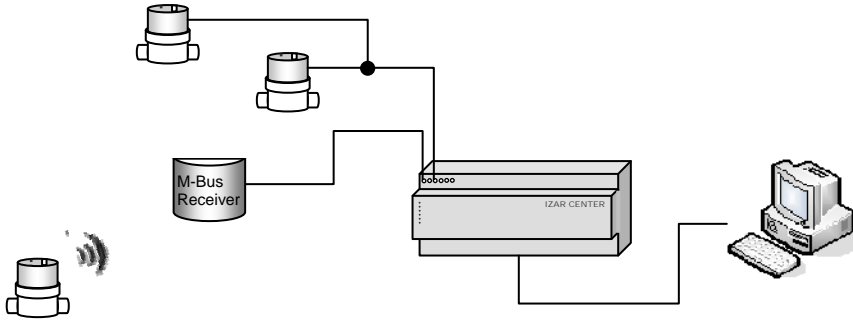
An IZAR CENTER MEMORY also is able to watch the data read from the M-Bus devices and if an alarm occurs it can send a SMS, e-mail or an M-Bus command to a dedicated device.



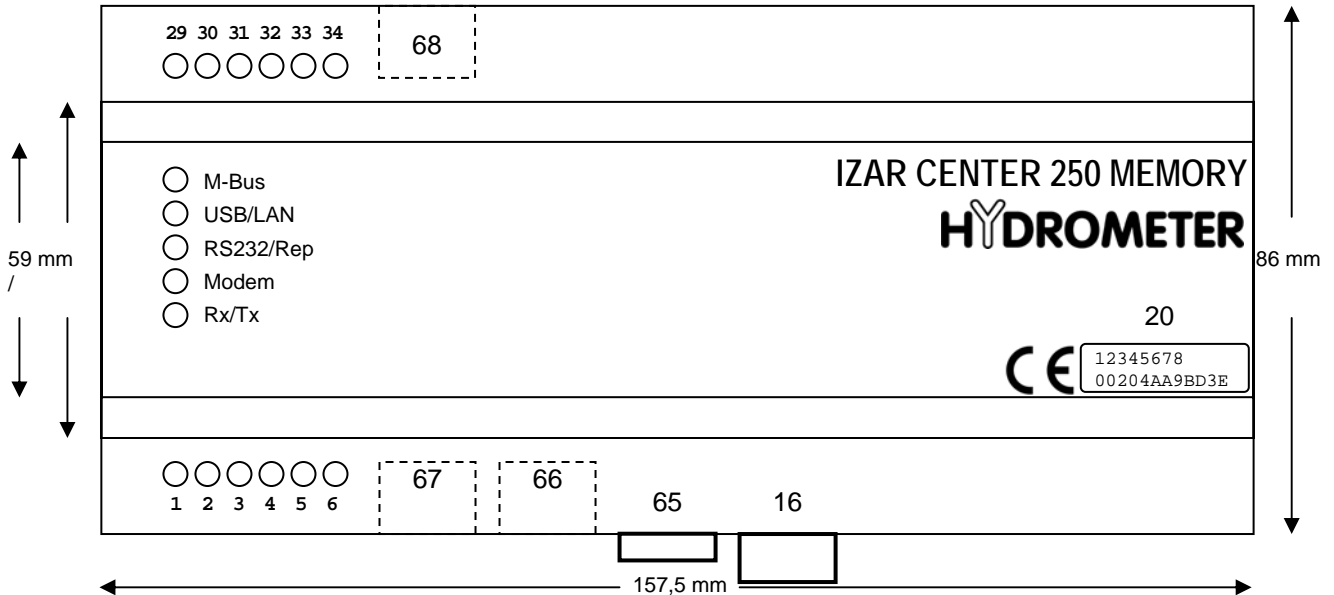
## 4.4 M-Bus and IZAR RADIO Meters in one System

One ore more HYDROMETER M-Bus Receiver can be connected to the IZAR CENTER to readout IZAR RADIO meters.

Because of HYDROMETER M-Bus Receivers do consume more power than usual M-Bus devices the number of M-Bus Receivers to be connected is limited. Please see installation sheet of HYDROMETER M-Bus Receiver for more details.



# 5 IZAR CENTER Housing and Connectors

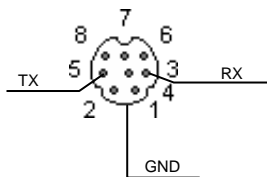


Number	Description
16	110..230 V AC
5,6	Protective earth
29,31,33	M-Bus output +
30,32,34	M-Bus output -
1	M-Bus Repeater input
2	M-Bus Repeater input
68	Connector for LAN
66	Connector for USB
67	Connector Mini DIN (8 pins) for connecting PC, Modem (RS232 interface)
20	Sticker with serial number and MAC Adress
65	Black hook

## 5.1 PC/ Modem Interface (67)

The serial interface (terminal 67) can be used either for connecting a PC or a modem (software switchable). The default configuration is PC. In the PC configuration device expects standard M-Bus communication (8E1, 300...57600 Baud) due to autobaud detection. Therefore each telegram start byte must be either 0x68 or 0x10 according to M-Bus standard.

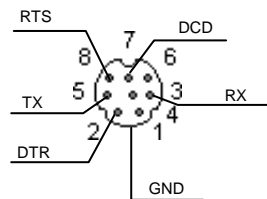
The PC interface is a 8 pin mini-DIN connector (female). To connect the PC use SUB9 female -> mini-DIN 8 male cable which is shipped with each unit. Following PINs of terminal are used:



TXD: Data transmitted from IZAR CENTER to PC (Output, IZAR CENTER → )  
 RXD: Data transmitted from PC to IZAR CENTER (Input, → IZAR CENTER)  
 GND: signal earth

All pins have got V.24 level (-12 .. -3 V and +3 V .. +12 V).  
 Pins without label are not connected.

The Modem interface is a 9 pin SUB DB connector (male) and its pin out is the same as the pin out of a serial PC connector. Therefore, a Modem can be connected using the interface cable supplied with the Modem.



DCD: Data Carrier Detect from Modem, is active as soon as a connection is established. (Input, → IZAR CENTER)  
 RXD: Data transmitted from Modem to IZAR CENTER (Input, → IZAR CENTER)  
 TXD: Data transmitted from IZAR CENTER to modem (Output, IZAR CENTER → )  
 DTR: Data Terminal Ready, IZAR CENTER is ready for data transmission. (Output, IZAR CENTER → )  
 GND: signal earth  
 RTS: Request To Send, HYDRO-CENTER is ready to receive data (Output, HYDRO-CENTER → )

All pins have got V.24 level (-12 .. -3 V and +3 V .. +12 V).  
 Pins without label are not connected.

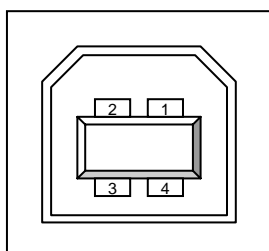
If a suitable GPRS Modem is connected, this interface provides the following functions:

- On demand readout of meters or IZAR CENTER (GSM dial-in)
- Automatic export of logger data to a FTP Server (only IZAR CENTER Memory, using GPRS)
- Send alarm notification SMS (only IZAR CENTER Memory)

## 5.2 USB Interface (66)

The USB interface (terminal 66, USB type B jack) can be used to connect IZAR CENTER directly to a PC or Laptop without any necessary configuration. IZAR CENTER enumerates as a HID USB device on the PC so there is no need to install a special driver.

All USB communication uses standard USB reports on EP0 which are packets of 64 bytes each. On SetReport communication standard M-Bus commands can be used. On GetReport communication IZAR CENTER uses byte[0] to show length of data in current packet and telegram data in packet starts at position byte[1].



Pinout:

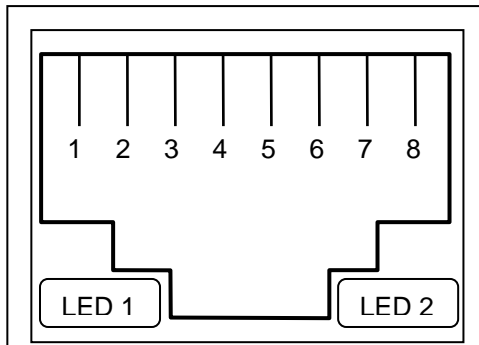
- 1 = VBus (5 V)
- 2 = D-
- 3 = D+
- 4 = GND

## 5.3 LAN Interface

The LAN interface (terminal 68, RJ45 jack) can be used to connect IZAR CENTER to a LAN (Local Area Network). The LAN interface provides following functions:

- On demand readout of meters or IZAR CENTER
- Automatic export of logger data to a FTP Server (only IZAR CENTER Memory)
- Send alarm notification E-Mail using a dedicated e-mail server (only IZAR CENTER Memory)

Communication via LAN interface is plain M-Bus using a TCP/IP tunnel. As default LAN interface is configured to expect M-Bus requests on TCP/IP port 10001 (settable).



Pinout:

1 = TX+

2 = TX-

3 = RX+

4 = Not used

5 = Not used

6 = RX-

7 = Not used

8 = Not used

SHIELD = Chassis ground

LED 1	
off	no activity
amber	half duplex
green	full duplex

LED 2	
off	no link
amber	10 Mbps
green	100 Mbps

# 6 M-Bus Communication IZAR CENTER (without Memory)

Without memory the IZAR CENTER is only a M-Bus Level Converter / M-Bus Repeater. But it is still selectable as a M-Bus slave and internal status values can be retrieved.

The IZAR CENTER answers only to secondary selection requests. Primary addressing and broadcasts (addresses FE and FF) are ignored. The only exception is the M-Bus baudrate command which can be used with the broadcast address FF.

All numbers in the following sections are hexadecimal, "Ch" stands for the M-Bus checksum of the telegram, "SAd" stands for the secondary address:

Manufacturer Code:   HYD (2324)  
Medium:                Bus / System (0E)  
Generation:            92                               (IZAR CENTER without Memory)

## 6.1 Secondary Selection

### Request (Selection):

68 0B 0B 68 73/53 FD 52 SAd0 SAd1 SAd2 SAd3 24 23 90/92 0E ChS 16

### Answer:

E5 or none

### Remarks:

If the secondary address of the IZAR CENTER is the same as SAd, the IZAR CENTER is selected and answers to all requests using the primary address FD.

IZAR CENTER (without memory) can be selected either with M-Bus generation byte 0x90 or 0x92 (backward compatibility to HYDRO-CENTER)

If the secondary address is not the same as SAd the IZAR CENTER is deselected and is no longer answering to the primary address FD.

The secondary address is the serial number printed on the label of the IZAR CENTER front.

It is possible to use wildcards (FF) for the complete SAd or parts of SAd.

## 6.2 Deselection

### Request (SND-NKE):

10 40 FD ChS 16

### Answer:

E5 or none

### Remarks:

If the IZAR CENTER was selected it is deselected and answers E5. If not selected it is not answering. The IZAR CENTER is also deselected if a selection telegram with another secondary address than its own is received (6.1).

## 6.3 Request Status

### Request (REQ-UD2):

10 7B/5B FD ChS 16

### Answer (RSP-UD):

68 7D 7D 68 08 FD 72 02 00 00 00 24 23 93 0E 01 00 00 00	
06 79 3E BD A9 4A 20 00	1. MAC Adress (example: 00-20-4A-A9-BD-3E)
0A FD 0E 10 01	2. Firmware version (example: LSB = 10 → version 1.0) MSB = 00 → IZAR CENTER 60 MSB = 01 → IZAR CENTER 250 MSB = 03 → IZAR CENTER 120
01 FD 17 C0	3. Flag (only internal use)
02 FD 59 22 00	4. M-Bus current in mA (example: 34 mA)
02 FD 47 37 09	5. M-Bus voltage (low) in 10 mV (example: 23590 mV)
82 40 FD 47 3F 0E	6. M-Bus voltage (high) in 10 mV (example: 36470 mV)
82 41 FD 47 31 0E	7. M-Bus voltage (on output) in 10 mV (example: 36330 mV)
02 FD 3A 00 00	8. Internal use
02 65 48 0D	9. Internal temperature in 10 m°C (example: 34000 m°C)
01 FD 1C BB	10. M-Bus Modem interface baudrate (BB = 2400 Baud)
ChS 16	

### Remarks:

The IZAR CENTER answers with a RSP\_UD telegram containing 10 data records as shown again in the table below:

Value #	Unit	Tariff	Storage	Data	Function	VIB	Description
1	0	0	0	INT 6	Instantan.	79	MAC Adress
2	0	0	0	BCD4	Instantan.	FD 0E	MSB = 00 → IC 60 MSB = 01 → IC 250 MSB = 03 → IC 120 LSB = Firmware version
3	0	0	0	INT1	Instantan.	FD 17	Flags for internal tests
4	0	0	0	INT2	Instantan.	FD 59	M-Bus current in mA
5	0	0	0	INT2	Instantan.	FD 47	M-Bus voltage high in 10 mV
6	1	0	0	INT2	Instantan.	FD 47	M-Bus voltage low in 10 mV
7	1	0	2	INT2	Instantan.	FD 47	M-Bus voltage on output in 10 mV
8	0	0	0	INT2	Instantan.	FD 3A	Internal use
9	0	0	0	INT2	Instantan.	65	Internal temperature
10	0	0	1	INT1	Instantan.	FD 1C	M-Bus interface baudrate

Data record 10 contains the M-Bus baudrate for Modem, USB and LAN interface. The table below shows the coding (according to M-Bus standard):

Value of RSP_UD (HEX)	Baudrate (Decimal)
B8	300
B9	600
BA	1200
BB	2400
BC	4800
BD	9600
BE	19200
BF	38400

## 6.4 Request Extended Status

The IZAR CENTER contains additional status values compared to 6.3. As long as there is no valid user verification the IZAR CENTER answers to a REQ\_UD2 in the same way as in 6.3. If the user verification is valid the RSP\_UD below is sent.

### Request (REQ-UD2):

10 7B/5B FD ChS 16

### Answer (RSP-UD):

68 7D 7D 68 08 FD 72 02 00 00 00 24 23 93 0E 01 00 00 00	
06 79 3E BD A9 4A 20 00	1. MAC Address (example: 00-20-4A-A9-BD-3E)
0A FD 0E 10 01	2. Firmware version (example: LSB = 10 → version 1.0) MSB = 00 → IZAR CENTER 60 MSB = 01 → IZAR CENTER 250 MSB = 03 → IZAR CENTER 120
01 FD 17 C0	3. Flag (only internal use)
02 FD 59 22 00	4. M-Bus current in mA (example: 34 mA)
02 FD 47 37 09	5. M-Bus voltage (low) in 10 mV (example: 23590 mV)
82 40 FD 47 3F 0E	6. M-Bus voltage (high) in 10 mV (example: 36470 mV)
82 41 FD 47 31 0E	7. M-Bus voltage (on output) in 10 mV (example: 36330 mV)
02 FD 3A 00 00	8. Internal use
02 65 48 0D	9. Internal temperature in 10 m°C (example: 34000 mC)
01 FD 1C BB	10. M-Bus Modem interface baudrate (BB = 2400 Baud)
04 6D 1F 29 03 1C	11. Current time, M-Bus coded (03.12.2008 09:31)
04 FD 2E 0A 00 00 00	12. Number of days/hours/minutes to read from memory in days, hours or minutes (example: 10 hours). 0 = complete memory Byte[2] can be 0x2D(min), 0x2E(hour), 0x2F(day)
04 FD 20 00 00 00 00	13. Which RSP_UD telegram (example: 0 = standard RSP_UD)
04 FD 08 FF FF 00 00	14. Cellular modem PIN-Code (FFFF = no cellular modem)
04 FD 21 10 75 03 00	15. First free memory cell in data logger memory (512 byte block number, example: Block # 226576)
0D FD 10 0B 52 45 54 4E 45 43 20 52 41 5A 49	16. User-definable data, containing e.g. the location address of the IZAR CENTER (max.107 chars, example: "IZAR CENTER")
0C 7F 00 00 00 00	17. Settings of serial interface (example: serial mode)
ChS 16	

### Remarks:

The extended status RSP\_UD contains 17 instead of 10 data records. The data records are listed again in the table below:

Value #	Unit	Tariff	Storage	Data	Function	VIB	Description
1	0	0	0	INT 6	Instantan.	79	MAC Adress
2	0	0	0	BCD4	Instantan.	FD 0E	MSB = 00 → IC 60 MSB = 01 → IC 250 MSB = 03 → IC 120 LSB = Firmware version
3	0	0	0	INT1	Instantan.	FD 17	Flags for internal tests
4	0	0	0	INT2	Instantan.	FD 59	M-Bus current in mA
5	0	0	0	INT2	Instantan.	FD 47	M-Bus voltage high in 10 mV
6	1	0	0	INT2	Instantan.	FD 47	M-Bus voltage low in 10 mV
7	1	0	2	INT2	Instantan.	FD 47	M-Bus voltage on output in 10 mV

8	0	0	0	INT2	Instantan.	FD 3A	Internal use
9	0	0	0	INT2	Instantan.	65	Internal temperature
10	0	0	1	INT1	Instantan.	FD 1C	M-Bus interface baudrate
11	0	0	0	INT4	Instantan.	6D	Current date and time (M-Bus, type F)
12	0	0	0	INT4	Instantan.	FD 2D 2E 2F	Number of minutes hours days to read from memory
13	0	0	0	INT4	Instantan.	FD 20	Which RSP_UD telegram
14	0	0	0	INT4	Instantan.	FD 08	Cellular modem PIN-Code
15	0	0	0	INT4	Instantan.	FD 21	First free memory cell in datalogger memory
16	0	0	0	Var	Instantan.	FD 10	user-definable data, containing e.g. the location address of the IZAR CENTER (max.107 chars)
17	0	0	0	BCD8	Instantan.	7F	Settings of serial interface

Data record 17 contains settings of the serial interface.

Data record structure: 0C 7F Mode Baudrate Parity NumOfStopBits

Coding of settings is shown in the table below:

Byte	Description	Value
Mode	Usage of Interface (serial or modem)	0x00 = serial, 0x01 = modem
Baudrate	Baudrate in modem mode	0x00 = 9600, 0x01 = 19200
Parity	Parity in modem mode	0x00 = no, 0x01 = even, 0x02 = odd
NumberOfStopBits	Number of stop bits in modem mode	0x00 = one stopbit, 0x01 = two stopbits

Remarks: Settings of Baudrate, Parity and NumberOfStopBits will be used in modem mode only. If serial mode is used, interface is switched to 8E1 with autobaud detection (300...57600 Baud)

## 6.5 Baudrate Switching M-Bus

Request (SND-UD):

68 03 03 68 53/73 FD Bdr ChS 16  
or

68 03 03 68 53/73 FF Bdr ChS 16

Answer:

E5 or none

Remarks:

If the Modem, LAN or USB interface is used for communication the input baudrate is fixed (modem) or not applicable (LAN, USB). The M-Bus baudrate in contrary is variable and can be set using this command. The currently set M-Bus baudrate is retrieved from the standard status RSP\_UD telegram (6.3). For the first version of the command (address FD) the IZAR CENTER has to be selected. An acknowledge is sent in this case.

The second version uses the broadcast address FF. No acknowledge is sent with this command. After a restart / reset of the IZAR CENTER the M-Bus baudrate is set to 2400 baud. Serial and M-Bus repeater interface is always auto detecting the M-Bus baudrate, therefore, this command provides nothing.

The byte "Bdr" stands for the new baudrate coded using the table below (M-Bus standard):

Bdr (HEX)	Baudrate (Decimal)
B8	300
B9	600
BA	1200
BB	2400
BC	4800
BD	9600
BE	19200
BF	38400

## 6.6 Username and Password Login

The data logger memory section of the IZAR CENTER is protected by a username and a password. Username and password are both 32 bit integer number (-2,000,000,000..+2,000,000,000). Factory setting is 0 for both values. The user is able to change username and password. If the user verification is not valid the data logger memory, data logger functions and changing of settings are not accessible (the respective commands are ignored). Following describes how to login.

### Request 1 (Selection):

68 0B 0B 68 73/53 FD 52 SAd0 SAd1 SAd2 SAd3 24 23 92 0E ChS 16

### Answer 1:

E5 (if secondary address correct)

### Request 2 (Enter username and password, SND-UD):

68 11 11 68 53/73 FD 51 04 FD 12 Use0 Use1 Use2 Use3 04 FD 16 Pas0 Pas1 Pas2 Pas3 ChS 16

(Use0 = LSB username, Pas0 = LSB Password)

### Answer 2:

E5 (if username and password correct, otherwise: no answer)

### Remarks:

The user verification is valid as long as the IZAR CENTER is not deselected (6.2). After deselection a new verification is necessary. Username and password must be transmitted in one telegram, username first.

## 6.7 Username and Password Changing

Factory setting of username and password is 0. Both values can be changed independently. The user verification has to be valid before you can change the username or password (6.6).

### Request (New Username):

68 0A 0A 68 53/73 FD 51 44 FD 12 Use0 Use1 Use2 Use3 ChS 16

(Use0 = LSB new username)

### Answer:

E5 (if the user verification is valid)

### Request (New password):

68 0A 0A 68 53/73 FD 51 44 FD 16 Pas0 Pas1 Pas2 Pas3 ChS 16

(Pas0 = LSB new password)

Answer:

E5 (if the user verification is valid)

Request (New username and password at once):

68 11 11 68 53/73 FD 51 44 FD 12 Use0 Use1 Use2 Use3 44 FD 16 Pas0 Pas1 Pas2  
Pas3 Chs 16

(Use0 = LSB username, Pas0 = LSB Password)

Answer:

E5 (if the user verification is valid)

## 6.8 Date and Time Setting

Date and time can be set using two different functions. The first is the standard M-Bus date / time set request which is only capable of setting the time with a precision of one minute. The second is a slightly extended date / time set request which sets the time with a precision of one second. Valid user verification is always necessary to set date and time.

Request (New date and time, standard):

68 09 09 68 53/73 FD 51 04 6D DT0 DT1 DT2 DT3 ChS 16  
(DT0 = LSB new date / time)

Answer:

E5 (if the user verification is valid)

Request (New date and time with seconds):

68 09 09 68 53/73 FD 51 06 6D DT0 DT1 DT2 DT3 Sec 00 ChS 16  
(DT0 = LSB new date / time)  
(Sec = Seconds 0..59 BCD)

Answer:

E5 (if the user verification is valid)

Remarks:

DTx is a 32 bit M-Bus coded value and contains date and time (Type F = Compound CP32: Date and Time):

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DT0	Valid Bit	Res.	Minutes (0..59)					
DT1	Daylight	Res.	Res.	Hours (0..23)				
DT2	Year (LSB, 0..99)			Day (1..31)				
DT3	Year (MSB, 0..99)				Month (1..12)			

## 6.9 M-Bus echo on/off

This command can be used to accelerate readouts from IZAR CENTER exclusively. If M-Bus echo was turned off using this command, incoming telegrams will not longer be forwarded to M-Bus slaves and only IZAR CENTER will respond to telegrams. In this mode IZAR CENTER does not stick to M-Bus timings but responses as fast as possible.

If M-Bus echo is turned on every incoming M-Bus telegram will be forwarded to connected slaves and IZAR CENTER respects timings defined in M-Bus specification (EN13757-2).

Request (switch M-Bus echo):

68 07 07 68 53/73 FD 51 0F 00 10 MBe Chs 16  
(MBe = MBus echo, 0 = off, 1 = on)

Answer:

E5 (if the user verification is valid)

## 6.10 PIN-Code for Cellular Modem Setting

If a Cellular Modem is connected to the IZAR CENTER the SIM card of the modem must be enabled using a 4 digit PIN-Code. The PIN-Code is stored into the IZAR CENTER as BCD value. After each reset of the IZAR CENTER or if FTP upload or SMS is sent the PIN-Code is used to enable the SIM card.

Request (Set PIN-Code):

68 0A 0A 68 53/73 FD 51 04 FD 08 PinL PinH 00 00 ChS 16  
(PinL = LSB of the PIN-Code)

Answer:

E5 (if the user verification is valid)

Remarks:

PIN-Code = 1234 → PinL = 34, PinH = 12

If modem connected to the IZAR CENTER is not a cellular modem the PIN-Code has to be set to PinL = FF and PinH = FF. This signals the IZAR CENTER not to initialise a cellular modem but a standard modem (eg. PSTN modem) instead.

## 6.11 Set User Data

The IZAR CENTER has got a 107 (decimal) bytes non-volatile storage space for user-definable data. The user may e.g. store the location address of the IZAR CENTER in here.

Request (Set user-definable data):

68 0A 0A 68 53/73 FD 51 0D FD 10 Len Dat1 Dat2..Datx ChS 16  
(Len = Length byte of data)  
(DatX = Data bytes)

Answer:

E5 (if the user verification is valid)

Remarks:

The user data are sent using a data record with variable length. The DIB is, therefore, 0D. The number of data bytes is sent in the byte after the VIB (Len). The user data can be retrieved using the standard RSP\_UD telegram if the user verification is valid (6.6).

The Len byte may not be larger than 107 (decimal) / 6B (hexadecimal).

## 6.12 RSP\_UD Answer Telegram Setting

This command is used to select the RSP\_UD answer telegram. Some Application Reset functions (6.16, 7.17) provide the same functionality.

In contrary to the IZAR CENTER without memory the memory version can answer to a REQ\_UD2 in different ways.

Request (set answer telegram, SND-UD):

68 0A 0A 68 53/73 FD 51 04 FD 20 Da0 00 00 00 ChS 16

Answer:

E5 (if the user verification is valid)

Da0 is coded using the table below:

Da0	RSP_UD Answer on next REQ_UD2	supported by IZAR CENTER (w/o memory)	supported by IZAR CENTER MEMORY
0x00	Standard RSP_UD (Status IZAR CENTER) 6.3, 6.4	✓	✓
0x01	Data logger values (using Special RSP_UD) 7.18	✗	✓
0x02	Device List 7.20	✗	✓
0x03	Data logger values (using Standard RSP_UD) 7.19	✗	✓
0x05	Alarm destination list 7.22	✗	✓
0x06	Alarm text list 7.23	✗	✓
0x07	Alarm action list 7.21	✗	✓
0x08	Modem GPRS provider settings 7.25	✓	✓
0x09	LAN interface settings 7.24	✓	✓
0x0B	FTP Servers 7.26	✗	✓
0x0C	E-Mail Server 7.28	✗	✓
0x0D	FTP upload cycle settings 7.27	✗	✓

## 6.13 Serial Interface Setting

This command is used to set serial interface of the IZAR CENTER. The interface supports two different modes: *serial mode* and *modem mode*. Serial mode will be used when connecting the IZAR CENTER directly to the PC (RS232 Interface). In serial mode autobaud detection and 8E1 communication is expected. Valid baudrates are 300...57600baud.

Modem mode is used to connect the IZAR CENTER to a modem (e.g. GSM, GPRS, PSTN). In this mode used baudrate, parity and number of stopbits between modem and IZAR CENTER can be set.

Request (set serial interface, SND-UD):

68 0A 0A 68 53/73 FD 51 0F 00 04 Mod Bdr Par Stb D6 16

Answer:

E5 (if the user verification is valid)

Mod, Bdr, Par and Stb codings:

Byte	Description	Value
Mod	Usage of Interface (serial or modem)	0x00 = serial, 0x01 = modem
Bdr	Baudrate in modem mode	0x00 = 9600, 0x01 = 19200
Par	Parity in modem mode	0x00 = no, 0x01 = even, 0x02 = odd
Stb	Number of stop bits in modem mode	0x00 = one stopbit, 0x01 = two stopbits

Remarks: Settings of Baudrate, Parity and NumberOfStopBits will be used in modem mode only. If serial mode is used, interface is switched to 8E1 with autobaud detection (300...57600 Baud). To retrieve current settings of the serial interface a request of extended status telegram may be performed (see 6.4)

## 6.14 LAN Interface TCP/IP Setting

This command is used to set up LAN interface. Following parameters can be set:

- IP/Adress
- DHCP name
- Subnet bits (for subnet mask)
- Gateway IP Address
- TCP/IP port for M-Bus communication (M-Bus over IP)
- DNS server IP-Address

Request (set E-Mail server data, SND-UD):

```
68 Len Len 68 53/73 FD 51 0F 00 0B IP0 IP1 IP2 IP3 SubB GW0 GW1 GW2 GW3 PortL
PortH LenDHCPN DHCPN0 DHCPNn DNS0 DNS1 DNS2 DNS3 Chs 16
```

Byte	Description	Value
IP0...IP3	TCP/IP address (IP0 = MSB, IP3 = LSB)	IP0...IP3 = 0 → DHCP mode, otherwise fixed IP address
SubB	Subnet bits (number of host bits to be entered)	0...32
GW0...GW3	TCP/IP address of standard gateway (GW0 = MSB, GW3 = LSB)	
PortL, PortH	TCP/IP port which is used for M-Bus-over-IP (PortL = LSB, PortH = MSB)	1024...65535
LenDHCPN	Length of DHCP name (max.16)	0...16
DHCPN0...DHCPNn	DHCP name of IZAR CENTER	0...16 chars
DNS0...DNS3	TCP/IP address of DNS server (DNS0 = MSB, DNS3 = LSB)	DNS0...DNS3 = 0 → don't use DNS

Answer:

E5 (if the user verification and provided data is valid)

Remarks:

SubB represents number of bits from Subnet mask, starting on least significant bit.

Examples:

SubB (Host Bits)	Netmask	Network Class
24	255.0.0.0	A
16	255.255.0.0	B
8	255.255.255.0	C

If you want IZAR CENTER to use a fixed IP address instead of DHCP (default) then a valid IP address is IP0...IP3 must be given. In this case you can set LenDHCPN = 0, and then omit parameter DHCP0...DHCPn. If you want to use DHCP instead, set IP0...IP3 to 0 (IP-Address 0.0.0.0) and specify LanDHCPN and DHCPN0...DHCPNn to provide a DHCP name for the IZAR CENTER (max 16 chars).

As default IZAR CENTER expects IP addresses as connection to FTP or mail servers. If you want to use URLs to provide these server connections a valid and reachable DNS server must be omitted in DNS0...DNS3. Please Note: Combination of URLs and IP addresses are not supported! After sending the request IZAR CENTER does not react to the same command for a few seconds if sent again.

## 6.15 Real Time Clock read

This command can be used to get current date and time from the internal real time clock of IZAR CENTER. After this request is sent, IZAR CENTER responds immediately with a manufacturer specific telegram containing year, month, day of month, hour, minute and second retrieved from internal real time clock.

### Request (get date and time):

68 06 06 68 53/73 FD 51 0F 00 0D Chs 16

### Answer:

68 18 18 68 08 FD 72 Sek0 Sek1 Sek2 Sek3 24 23 93 0E 05 00 00 00 0F 00 0D YY MM  
dd hh mm ss Chs 16

Byte	Description	Value
Sek0...Sek3	Secondary M-Bus address of IZAR CENTER	(4 Byte BCD, equals serial num.)
YY	current year	00...99
MM	current month	01...12
dd	current day	01...31 (depending on month)
hh	current hour	00...23
mm	current minute	00...59
ss	current second	00...59

## 6.16 Application Reset Functions

Using the so-called Application Reset functions the IZAR CENTER can be reset to default. It is also possible to switch between different response telegrams or start some self-test functions. An Application Reset request is performed in the following way:

### Request (Application Reset):

68 04 04 68 53/73 FD 50 <ResetSubcode> Chs 16

### Answer:

E5 (if the user verification is valid)

### 6.16.1 Reset Subcode 00 = Reset to Standard RSP\_UD

All subsequent REQ\_UD2 requests are answered using a standard RSP\_UD telegram (IZAR CENTER status or extended status, 6.3 or 6.4).

### Request (Application Reset):

68 04 04 68 53/73 FD 50 00 Chs 16

### Answer:

E5 (if the user verification is valid)

### 6.16.2 Reset Subcode 65 = RSP\_UD containing TCP/IP settings

All subsequent REQ\_UD2 requests are answered with TCP/IP settings using standard RSP\_UD telegrams (7.24).

### Request (Application Reset):

68 04 04 68 53/73 FD 50 65 Chs 16

### Answer:

E5 (if the user verification is valid)

### **6.16.3 Reset Subcode 80 = IZAR CENTER Reset**

The IZAR CENTER acknowledges the request with E5 performs a reset (warm start).

Request (Application Reset):

68 04 04 68 53/73 FD 50 80 ChS 16

Answer:

E5

# 7 M-Bus Communication IZAR CENTER (with Memory)

## 7.1 General

IZAR CENTER MEMORY devices support all M-Bus commands from IZAR CENTER (without memory). In addition there are some more commands to configure automatic meter reading and alarm functions

## 7.2 Maintenance Mode on/off

This command is used to start/stop automatic meter reading and thus also alarm functions like SMS, E-Mail and M-Bus action.

If user wants to read slaves on M-Bus and automatic meter reading of IZAR CENTER is busy at this moment user gains no access to the slaves due to automatic reading has higher priority. Therefore user is able to switch on maintenance mode to stop automatic reading. This command may be useful if user wants to add new meters to the system, change a device- or alarmlist or do some diagnostics with the slaves.

### Request (switch Maintenance Mode):

68 07 07 68 53/73 FD 51 0F 00 11 MM Chs 16  
(MM = Maintenance Mode, 0 = off, 1 = on )

### Answer:

E5 (if the user verification is valid)

## 7.3 Maximum Number of Days to Read from Data Logger Memory

Since the data logger memory of the IZAR CENTER is rather large (~500 000 meter readouts), it is not recommendable to read the memory completely all the time. Using this command you can set the number of days|hours|minutes to read from the most current timepoint to a past timepoint.

### Request (Maximum number of days to read):

68 0A 0A 68 53/73 FD 51 04 FD 2F Da0 Da1 00 00 ChS 16  
(Da0 = LSB days to read)

### Request (Maximum number of hours to read):

68 0A 0A 68 53/73 FD 51 04 FD 2E Ho0 Ho1 00 00 ChS 16  
(Ho0 = LSB hours to read)

### Request (Maximum number of minutes to read):

68 0A 0A 68 53/73 FD 51 04 FD 2D Mi0 Mi1 00 00 ChS 16  
(Mi0 = LSB minutes to read)

Answer:

E5 (if the user verification is valid)

Remarks: Valid values for day|hour|minute are 0...65535. Value 0 is a special case and if set IZAR CENTER will return complete memory (not recommended). Combining these commands to set different values for day|hour|minute is not possible.

## 7.4 Readout Cycle Time Setting

This command is only acknowledged due to backward compatibility to HYDRO-CENTER Memory and simply does nothing. In difference to HYDRO-CENTER readout cycle in IZAR CENTER can be set individually for each M-Bus slave who is added to the IZAR CENTER devicelist (see 7.10)

Request (New readout cycle time – HYDRO-CENTER):

68 0A 0A 68 53/73 FD 51 04 FD 25 Cy0 Cy1 00 00 ChS 16  
(Cy0 = LSB new readout cycle time)

Answer:

E5 (if the user verification is valid)

## 7.5 GPRS Connection Setting

This command is used to set necessary parameters for a GPRS connection which IZAR CENTER is able to use on a FTP upload via connected and suitable GPRS modem.

To use a GPRS connection following data must be provided:

- Provider-GPRS-URL (max. 40 chars)
- username (max 30 chars)
- password (20 chars)

Request (set GPRS connection data, SND-UD):

68 Len Len 68 53/73 FD 51 0F 00 05 LenURL URL1 URLn LenUN UN1 UNn LenPW PW1 PWn  
Chs 16

Answer:

E5 (if the user verification and provided data is valid)

Remarks:

All three parameters must be provided and must not exceed maximum length.

## 7.6 FTP Server Connection Setting

This command is used to set necessary data for a FTP upload.

Therefore two parameter sets can be set:

- Main FTP
  - URL/IP Adress of FTP Server (max. 40 chars)
  - Username (max. 40 chars)
  - Password (max. 40 chars)
  - Destination directory (max.60 chars)
- Backup FTP server
  - URL/IP Adress of FTP Server (max. 40 chars)
  - Username (max. 40 chars)
  - Password (max. 40 chars)
  - Destination directory (max.60 chars)

If connection to the Main FTP Server fails and a Backup FTP Server is specified the device tries to upload memory data to the Backup FTP Server.

**Request (set FTP server data, SND-UD):**

68 Len Len 68 53/73 FD 51 0F 00 06 Srv LenURL URL1 URLn LenUN UN1 UNn LenPW PW1 PWn LenDIR DIR1 DIRn Chs 16

**Answer:**

E5 (if the user verification and provided data is valid)

Byte	Description	Value
Srv	Server parameter set (Main/ Backup FTP Srv)	0 = Main FTP Srv 1 = Backup FTP Srv
LenURL	Length of FTP server URL/IP in bytes	1..40
URL1...URLn	URL/IP adress of FTP server	data bytes (max. 40 chars, according to LenURL)
LenUN	Length of FTP server username in bytes	1..40
UN1...UNn		data bytes (max. 40 chars, according to LenUN)
LenPW	Length of FTP server password in bytes	1..40
PW1...PWn		data bytes (max. 40 chars, according to LenPW)
LenDIR	Length of FTP server destination directory in bytes	1..60
DIR1...DIRn	Destination directory on FTP server	data bytes (max. 60 chars, according to LenDIR)

**Remarks:**

To specify upload to root directory on FTP server, destination directory parameter is "/" (slash). On each parameter set all parameters must be provided.

## 7.7 FTP Upload cycle Setting

To specify FTP upload options this command is used.

**Request (set FTP upload cycle data, SND-UD):**

68 11 11 68 53/73 FD 51 0F 00 08 ItvL ItvH IF Byt0 Byt1 Byt2 Byt3 NoT0 Not1 uplUnit0 uplUnit1 E9 16

**Answer:**

E5 (if the user verification and provided data is valid)

Byte	Description	Value
ItvL, ItvH	Upload interval in upload units (ItvL = LSB, ItvH = MSB)	0 (= deactivated)...65535
IF	Upload interface (LAN or GPRS modem)	0 = GPRS modem (ext. connected) 1 = LAN (integrated)
Byt0...Byt3	Max. number of bytes per upload (Byt0 = LSB, Byt3 = MSB)	0x00000000 (= max. complete memory) 0xFFFFFFFF ()
NoT0, Not1	Max. number of meter telegrams per upload (NoT0 = LSB, NoT1 = MSB)	0 (= max. complete memory) 65535 meter telegrams

uplUnit0, uplUnit1	Upload unit for upload interval (uplUnit0 = LSB, uplUnit1 = MSB)	0 = deactivated (no upload) 1 = Upload unit minutes 2 = Upload unit hours 3 = Upload unit days
-----------------------	---	---

**Remarks:**

On every FTP upload only new data will be uploaded. If Bytn and NoTn is 0 all new data will be uploaded. If memory has plenty of new data at maximum complete memory is uploaded.

## 7.8 E-Mail Server Setting

This command is used to set communication parameters for an alarm E-Mail.

**Request (set E-Mail server data, SND-UD):**

```
68 Len Len 68 53/73 FD 51 0F 00 09 00 LenPOPURL POPURL0 POPURLn LenSMTPURL
SMTPURL0 SMTPURLn LenPOPUN POPUN0 POPUNn LenSMTPUN SMTPUN0 SMTPUNn LenPass Pass0
Passn LenFrom From0 Fromn Chs 16
```

Byte	Description	Value
LenPOPURL	Length of POP server URL or IP Address string	1..40
POPURL0 , POPURLn	POP server URL or IP Address string	1...40 chars (according to LenPOPURL)
LenSMTPURL	Length of SMTP server URL or IP Address string	1...40
SMTPURL0 , SMTPURLn	SMTP server URL or IP Address string	1...40 chars (according to LenSMTPURL)
LenPOPUN	Length of POP server username string	1...20
POPUN0 , POPUNn	POP server username string	1...20 chars (according to LenPOPUN)
LenSMTPUN	Length of SMTP server username string	1...20
SMTPUN0 , SMTPUN1	SMTP server username string	1...20 chars (according to LenSMTPUN)
LenPass	Length of password for SMTP/POP server	1...20
Pass0 , Passn	Password for SMTP and POP server	1...20 chars (according to LenPass)
LenFrom	Length of "mail from:" string	1...70
From0 , Fromn	"mail from:" string	1...70 chars (according to LenFrom)

**Answer:**

E5 (if the user verification and provided data is valid)

**Remarks:**

All parameters must be provided. E-Mail only will be sent if alarm occurs and E-Mail notification is enabled in according devicelist item. Alarm E-Mails are only sent via LAN interface of IZAR CENTER.

## 7.9 Devicelist write

The IZAR CENTER Memory is able to automatically read out up to 1000 M-Bus slaves with individual readout intervals. Therefore it is necessary to write a device list into the IZAR CENTER.

### Request 1 (SND-UD, device list entry 1):

68 F5 F5 68 53/73 FD 51

1F (M-Bus flag: manufacturer specific data +more data in next telegram)

00 0E (Devicelist item telegram)

### (Example of a device list entry, coding described in 7.10)

```
00 00 0F 00 78 56 34 12 24 23 04 29 FF FF FF FF 00 1F 02 52 00 FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 00 02 6D 79 4D 42 75
73 53 6C 61 76 65 31 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Chs 16

### Answer 1:

E5 (if the user verification is valid)

### Request 2 (SND-UD, device list transmission completed):

68 0A 0A 68 53/73 FD 51

0F (M-Bus flag: manufacturer specific data without more data in next telegram)

00 0E (Devicelist item telegram)

FF AA 55 00 (Flag: device list transmission finished)

ChS 16

### Answer 2:

E5 (if the user verification is valid)

### Remarks:

- Request 1 must be repeated for each device list entry.
- The coding of the device list is described in 7.10.
- It is very important that the numbering of the parts is correct (see 7.10). During device list programming the numbering starts with 0000H and counts up 0001H for each device entry.
- The device list will not be stored if request 2 is not received (device list complete).
- If no further devicelist item or request 2 is received during transmission within 3 seconds between the telegrams, devicelist may be inconsistent or will not be stored due to IZAR CENTER aborts devicelist receive mode.
- To clear a devicelist only send Request 2

## 7.10 Devicelist coding

The device list is stored in non volatile memory of an IZAR CENTER Memory. It tells IZAR CENTER which, how and when to readout the slave and also contains information for alarming. Each device has got a 239 byte devicelist item and memory is able to store up to 1000 devicelist items. Therefore the devicelist may contain up to 1000 devices.

Each devicelist item contains information about the readout interval, selection of the respective M-Bus slave, the baudrate, its address, a description and more.

Depending on the selection method there are two different codings for a device entry. Version 1 is used with primary, secondary and secondary selection with fabrication number. Version 2 is used with customer selection. Byte 18 (Type of M-Bus device selection) of the device entry decides which version the entry is. In general the two versions are only different in byte 4 to 15.

### Version 1 (Standard):

Byte	Count	Description
0..1	2 (HEX)	Index of the entry <u>Programming:</u> starts with 0000, is counted up +01 (hex), LSB first <u>Readout:</u> starts with 0000, is counted up +01 (hex), LSB first
2..3	2 (HEX)	Readout interval (LSB first) <u>Value:</u> <u>Description:</u> 0x0000            no automatic readout 0x0001            1 Minute interval 0x0005            5 Minute interval 0x000F            15 Minute interval 0x003C            60 Minute interval 0x00B4            3 Hour interval 0x0168            6 Hour interval 0x02D0            12 Hour interval 0x05A0            1 Day interval 0x4EC0            1st and 15th of month interval
4..7	4 (BCD)	Device ID (M-Bus device ID, usually the serial number)
8..9	2 (HEX)	M-Bus manufacturer code (e.g. 2423 for HYD)
10	1 (HEX)	M-Bus medium (e.g. 07 for Water)
11	1 (HEX)	M-Bus generation (version code of the device)
12..15	4 (BCD)	Fabrication number (only valid with fabrication number selection)
16	1 (HEX)	Primary address (only valid with primary addressing)
17	1 (HEX)	Baudrate (baudrate divider for IZAR CENTER UART) possible values: FF    300 baud 7F    600 baud 3F    1200 baud 1F    2400 baud 0F    4800 baud 07    9600 baud
18	1 (HEX)	Type of M-Bus device selection: 00    No Selection 01    Primary 02    Secondary 04    Secondary with fabrication number 08    Selection using customer number and address
19	1 (HEX)	CI-field of selection telegram 52    Standard M-Bus selection 56    M-Bus selection for mode 2 device (new) 51    Old M-Bus mode 1 selection 55    Old M-Bus mode 2 selection (e.g. HYDROMETER Flypper I)
20	1 (HEX)	Lengthbyte for optional data selection telegram, e.g. Application Reset (if not used set to 0x00)

21..70	50 (HEX)	Optional data selection telegram (set unused bytes to 0xFF)
71..73	3 (HEX)	Reserved (set to FF)
74	1 (HEX)	Reserved (set to 0x00)
75	1 (HEX)	Number of readout retries if no or false response from slave (0=no retries, valid for each step of readout)
76..157	82 (HEX)	Optional human readable device description (set unused bytes to FF)
158	1 (HEX)	Reserved (set to 0x00)
159..166	8 (HEX)	Reserved (set to 0xFF)
167..174	8 (HEX)	Alarm 1 threshold (alarm reference value)
175	1 (HEX)	Alarm 1 threshold type: 00 Consumption alarm 01 Instaneous 02 Bitmask
176..186	11(HEX)	Alarm 1 DIF
187..197	11 (HEX)	Alarm 1 VIF
198	1 (HEX)	Alarm 1 current state (1= alarm condition TRUE, 0 = alarm condition FALSE )
199	1 (HEX)	Alarm 1 destination index (index of alarm address list, 00..09)
200	1 (HEX)	Alarm 1 text index (index of alarm text list, 00..09)
201	1 (HEX)	Alarm 1 action index (index of alarm action list, 00..63)
202	1 (HEX)	Alarm 1 function enable (SMS, E-Mail, M-Bus action if alarm 1 occurs): 0x00 = no alarm function Bit0 = E-Mail notification Bit1 = SMS notification Bit2 = M-Bus action
203..210	8 (HEX)	Alarm 2 threshold
211	1 (HEX)	Alarm 2 threshold type 00 Consumption alarm 01 Instaneous 02 Bitmask
212..222	11(HEX)	Alarm 2 DIF
223..233	11 (HEX)	Alarm 2 VIF
234	1 (HEX)	Alarm 2 current state (1= alarm condition TRUE, 0 = alarm condition FALSE )
235	1 (HEX)	Alarm 2 destination index (index of alarm address list, 00..09)
236	1 (HEX)	Alarm 2 text index (index of alarm text list, 00..09)
237	1 (HEX)	Alarm 2 action index (index of alarm action list, 00..63)
238	1 (HEX)	Alarm 2 function enable (SMS, E-Mail, M-Bus action if alarm 1 occurs): 0x00 = no alarm function Bit0 = E-Mail notification Bit1 = SMS notification Bit2 = M-Bus action

Version 2 (only used in conjunction with customer selection, byte 16 = 08):

Byte	Count	Description
0..1	2 (HEX)	Index of the entry <u>Programming:</u> starts with 0000, is counted up +01 (hex), LSB first <u>Readout:</u> starts with 0000, is counted up +01 (hex), LSB first
2..3	2 (HEX)	Readout interval (LSB first) <u>Value:</u> <u>Description:</u> 0x0000                    no automatic readout 0x0001                    1 Minute interval 0x0005                    5 Minute interval 0x000F                    15 Minute interval 0x003C                    60 Minute interval 0x00B4                    3 Hour interval 0x0168                    6 Hour interval

		0x02D0      12 Hour interval 0x05A0      1 Day interval 0x4EC0      1st and 15th of month interval
<b>4..9</b>	<b>6 (BCD)</b>	<b>Customer address</b>
<b>10..15</b>	<b>6 (BCD)</b>	<b>Customer number</b>
16	1 (HEX)	Primary address (only valid with primary addressing)
17	1 (HEX)	Baudrate (baudrate divider for IZAR CENTER UART) possible values: FF    300 baud 7F    600 baud 3F    1200 baud 1F    2400 baud 0F    4800 baud 07    9600 baud
18	1 (HEX)	Type of M-Bus device selection: 00    No Selection 01    Primary 02    Secondary 04    Secondary with fabrication number 08    Selection using customer number and address
19	1 (HEX)	CI-field of selection telegram 52    Standard M-Bus selection 56    M-Bus selection for mode 2 device (new) 51    Old M-Bus mode 1 selection 55    Old M-Bus mode 2 selection (e.g. HYDROMETER Flypper I)
20	1 (HEX)	Lengthbyte for optional data selection telegram, e.g. Application Reset (if not used set to 0x00)
21..70	50 (HEX)	Optional data selection telegram (set unused bytes to 0xFF)
71..73	3 (HEX)	Reserved (set to FF)
74	1 (HEX)	Reserved (set to 0x00)
75	1 (HEX)	Number of readout retries if no or false response from slave (0=no retries, valid for each step of readout)
76..157	82 (HEX)	Optional human readable device description (set unused bytes to FF)
158	1 (HEX)	Reserved (set to 0x00)
159..166	8 (HEX)	Reserved (set to 0xFF)
167..174	8 (HEX)	Alarm 1 threshold (alarm reference value)
175	1 (HEX)	Alarm 1 threshold type: 00    Consumption alarm 01    Instaneous 02    Bitmask
176..186	11(HEX)	Alarm 1 DIF
187..197	11 (HEX)	Alarm 1 VIF
198	1 (HEX)	Alarm 1 current state (1= alarm condition TRUE, 0 = alarm condition FALSE )
199	1 (HEX)	Alarm 1 destination index (index of alarm address list, 00..09)
200	1 (HEX)	Alarm 1 text index (index of alarm text list, 00..09)
201	1 (HEX)	Alarm 1 action index (index of alarm action list, 00..63)
202	1 (HEX)	Alarm 1 function enable (SMS, E-Mail, M-Bus action if alarm 1 occurs): 0x00 = no alarm function Bit0 = E-Mail notification Bit1 = SMS notification Bit2 = M-Bus action
203..210	8 (HEX)	Alarm 2 threshold
211	1 (HEX)	Alarm 2 threshold type 00    Consumption alarm 01    Instaneous 02    Bitmask
212..222	11(HEX)	Alarm 2 DIF
223..233	11 (HEX)	Alarm 2 VIF
234	1 (HEX)	Alarm 2 current state (1= alarm condition TRUE, 0 = alarm condition FALSE )

235	1 (HEX)	Alarm 2 destination index (index of alarm address list, 00..09)
236	1 (HEX)	Alarm 2 text index (index of alarm text list, 00..09)
237	1 (HEX)	Alarm 2 action index (index of alarm action list, 00..63)
238	1 (HEX)	Alarm 2 function enable (SMS, E-Mail, M-Bus action if alarm 1 occurs): 0x00 = no alarm function Bit0 = E-Mail notification Bit1 = SMS notification Bit2 = M-Bus action

## 7.11 Alarm List M-Bus Action – write

This command is used to write Alarm-M-Bus action list to IZAR CENTER. This list contains 100 alarm action items. If alarm condition of a slave becomes true and M-Bus action is defined and enabled in according devicelist item IZAR CENTER can send a free definable M-Bus command to any connected slave. For example send a command to a HYDRO-PORT control to switch a pump. The coding of alarm-action list can be found at 7.12

### Request 1 (SND-UD, alarm action list entry 1):

68 Len Len 68 53/73 FD 51

1F (M-Bus flag: manufacturer specific data +more data in next telegram)

00 01 (Alarm action item telegram)

(Example of a alarm action list item, coding described in 7.12)

00 78 56 34 12 24 23 0E 97 00 00 00 00 00 1F 02 52 02 29 68 23 23 68 73 FD 51 01  
7A FF 07 79 FF FF FF FF 24 23 97 0E 41 FD 1A 01 81 01 FD 1A 00 C1 40 FD 1A 01 81  
41 FD 1A 00 87 16 0A 53 77 69 74 63 68 50 75 6D 70

Chs 16

Example:

Index: 00

Sek. Adr: 12345678

Manufacturer: HYD (2324)

Medium: System (0E)

Generation: 97 (HYDRO-PORT control)

Baudrate: 2400

Retries: 2

M-Bus command:

6823236873FD51017AFF0779FFFFFFFF2423970E41FD1A018101FD1A00C140FD1A018141FD1A008716

(switch relais 1 and relais 2 of HYDRO PORT CONTROL to close-state)

Alarm action description: "SwitchPump"

Answer:

E5

(if the user verification and data is valid)

Remarks:

- It is recommended to switch to maintenance mode during write of new list due to unpredictable behavior if alarm occurs at that time
- All item parameters must be supplied
- No end-of-list M-Bus command is necessary
- To write and activate the new alarm action list exactly 100 items must be sent to IZAR CENTER

- After last item is sent list becomes active
- Maximum time duration between items sent must not exceed 3 seconds
- If sending of list was aborted or list is incomplete, old list will still be used instead (if defined)

## 7.12 Alarm List M-Bus Action coding

The alarm action list is stored in non-volatile memory of IZAR CENTER. Alarm action list consists on 100 alarm action items. The coding of a alarm action item can be seen in the table below:

Byte	Count	Description
0	1 (HEX)	Index of the entry <u>Programming:</u> starts with 0000, is counted up +01 (hex), LSB first <u>Readout:</u> starts with 0000, is counted up +01 (hex), LSB first
1..4	4 (BCD)	Device ID (M-Bus device ID, usually the serial number)
5..6	2 (HEX)	M-Bus manufacturer code (e.g. 2423 for HYD)
7	1 (HEX)	M-Bus medium (e.g. 07 for Water)
8	1 (HEX)	M-Bus generation (version code of the device)
9..12	4 (HEX)	Fabrication number (only valid with fabrication number selection)
13	1 (HEX)	Primary address (only valid with primary addressing)
14	1 (HEX)	Baudrate (baudrate divider for IZAR CENTER UART) possible values: FF 300 baud 7F 600 baud 3F 1200 baud 1F 2400 baud 0F 4800 baud 07 9600 baud
15	1 (HEX)	Type of M-Bus device selection: 00 No Selection 01 Primary 02 Secondary 04 Secondary with fabrication number 08 Selection using customer number and address
16	1 (HEX)	CI-field of selection telegram 52 Standard M-Bus selection 56 M-Bus selection for mode 2 device (new) 51 Old M-Bus mode 1 selection 55 Old M-Bus mode 2 selection (e.g. HYDROMETER Flypper I)
17	1 (HEX)	Number of readout retries if no or false response from slave (0=no retries, valid for each step of readout)
18	1 (HEX)	Length of M-Bus action command telegram in bytes
20..	1..100(HEX)	M-Bus action command telegram
	1 (HEX)	Length of optional alarm action description
	0..100 (HEX)	alarm action description (human readable identifier for alarm action)

## 7.13 Alarm Destination List – write

This command is used to write alarm destination list to IZAR CENTER. This list contains 10 alarm destination items. Each item can be understood as an address book entry.

If alarm condition of a slave becomes true and SMS/E-Mail notification is defined and enabled in according devicelist item the IZAR CENTER can send a SMS and/or E-Mail to a dedicated receiver. The coding of alarm destination list can be found at 7.14.

Request 1 (SND-UD, alarm destination list entry 1):

68 Len Len 68 53/73 FD 51

1F (M-Bus flag: manufacturer specific data +more data in next telegram)

00 02 (Alarm destination telegram)

(Example of an alarm destination item, coding described in 7.14)

00 06 4D 79 4E 61 6D 65 0B 2B 34 39 31 32 33 34 35 36 37 38 0E 6D 65 40 65 78 61  
6D 70 6C 65 2E 63 6F 6D

Chs 16

Example:

Name: „MyName“

Phone number: +4912345678

E-Mail address: me@example.com

Answer:

E5 (if the user verification and data is valid)

Remarks:

- It is recommended to switch to maintenance mode during write of new list due to unpredictable behavior if alarm occurs at that time
- All item parameters must be supplied
- No end-of-list M-Bus command is necessary
- To write and activate the new alarm destination list exactly 10 items must be sent to IZAR CENTER
- After last item is sent list becomes active
- Maximum time duration between items sent must not exceed 3 seconds
- If sending of list was aborted or list is incomplete, old list will still be used instead (if defined)

## 7.14 Alarm destination list coding

The alarm destination list is stored in non-volatile memory of IZAR CENTER. Alarm destination list consists on 10 alarm destination items. The coding of an alarm destination item can be seen in the table below:

Byte	Count	Description
0	1 (HEX)	Index of the entry <u>Programming:</u> starts with 0000, is counted up +01 (hex), LSB first <u>Readout:</u> starts with 0000, is counted up +01 (hex), LSB first
1	1 (HEX)	length of destination name string (valid values: 1..40, according to destination name string)
n	n (HEX)	destination name string (1...40 chars)
n	1 (HEX)	mobile phone number string length (valid values: 1...20, according to mobile phone number string)
n	n (HEX)	mobile phone number string
n	1 (HEX)	e-mail address string length (valid values: 1...50, according to e-mail address string)
n	n (HEX)	e-mail address string

Remarks:

Mobile phone number must be supplied in special formats.

Possible formats are:

- „016012345678“ (leading zero)
- „+4917212345678“ (international)

## 7.15 Alarm Text List – write

This command is used to write alarm text list to IZAR CENTER. This list contains 10 alarm text items. Alarm text is an optional and user definable text which can be send within an alarm message. If alarm condition of a slave becomes true and SMS/E-Mail notification is defined and enabled in according devicelist item the IZAR CENTER will send a SMS and/or E-Mail to a dedicated receiver. The message will then consist of alarm information and additionally with defined alarm text. The coding of alarm text list can be found at 7.16.

Request 1 (SND-UD, alarm destination list entry 1):

68 Len Len 68 53/73 FD 51

1F (M-Bus flag: manufacturer specific data +more data in next telegram)

00 03 (Alarm destination telegram)

(Example of an alarm text item, coding described in 7.16)

00 10 4D 79 20 41 6C 61 72 6D 20 4D 65 73 73 61 67 65

Chs 16

Example:

Text: "My Alarm Message"

Answer:

E5 (if the user verification and data is valid)

## 7.16 Alarm Text List coding

The alarm text list is stored in non-volatile memory of IZAR CENTER. Alarm Text List consists of 10 alarm list items. The coding of an alarm text item can be seen in the table below:

Byte	Count	Description
0	1 (HEX)	Index of the entry <u>Programming:</u> starts with 0000, is counted up +01 (hex), LSB first <u>Readout:</u> starts with 0000, is counted up +01 (hex), LSB first
1	1 (HEX)	Length of alarm text string (valid values: 1..40, according to alarm text string)
n	n (HEX)	Alarm text string string (1...40 chars)

## 7.17 Application Reset Functions

### 7.17.1 Reset Subcode 10 = RSP\_UD containing Data logger Values (Special RSP\_UD)

All subsequent REQ\_UD2 requests are answered with data logger values using special RSP\_UD telegrams (7.18).

Request (Application Reset):

68 04 04 68 53/73 FD 50 10 ChS 16

Answer:

E5 (if the user verification is valid)

### 7.17.2 Reset Subcode 20 = RSP\_UD containing Data logger Values (Standard RSP\_UD)

All subsequent REQ\_UD2 requests are answered with data logger values using standard RSP\_UD telegrams (7.19).

Request (Application Reset):

68 04 04 68 53/73 FD 50 20 ChS 16

Answer:

E5 (if the user verification is valid)

### 7.17.3 Reset Subcode 60 = RSP\_UD containing Device List

All subsequent REQ\_UD2 requests are answered with device list entries using standard RSP\_UD telegrams (7.20).

Request (Application Reset):

68 04 04 68 53/73 FD 50 60 ChS 16

Answer:

E5 (if the user verification is valid)

### 7.17.4 Reset Subcode 61 = RSP\_UD containing Alarm M-Bus Action List

All subsequent REQ\_UD2 requests are answered with alarm M-Bus Action List entries using standard RSP\_UD telegrams (7.21).

Request (Application Reset):

68 04 04 68 53/73 FD 50 61 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.5 Reset Subcode 62 = RSP\_UD containing Alarm Destination List**

All subsequent REQ\_UD2 requests are answered with Alarm Destination List entries using standard RSP\_UD telegrams (7.22).

Request (Application Reset):

68 04 04 68 53/73 FD 50 62 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.6 Reset Subcode 63 = RSP\_UD containing Alarm Text List**

All subsequent REQ\_UD2 requests are answered with Alarm Text List entries using standard RSP\_UD telegrams (7.23).

Request (Application Reset):

68 04 04 68 53/73 FD 50 63 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.7 Reset Subcode 70 = FTP Testupload**

This command is used to trigger a test FTP upload. IZAR CENTER performs an upload to Main FTP Server. If connection to Main FTP Server fails, IZAR CENTER tries to upload data to Backup FTP Server. A Test Upload has the same behavior as a regular time triggered upload. Thus all data which remains from last upload will be included in Testupload.

Request (Application Reset):

68 04 04 68 53/73 FD 50 61 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.8 Reset Subcode 71 = Alarm E-Mail Test**

This command is used to trigger a fake alarm which causes a send of an E-Mail to test proper settings of E-Mail server connection.

Request (Application Reset):

68 04 04 68 53/73 FD 50 71 ADstI AtxI ChS 16  
(ADstI = Alarm destination index (0x00...0x09),  
AtxI = Alarm Text Index (0x00...0x09))

Answer:

E5 (if the user verification is valid)

Remarks:

- This function is only feasible if LAN interface is connected and a suitable E-Mail-Server is reachable.

- Function can not be triggered if:
  - Alarm-E-Mail sending already busy
  - FTP Upload in progress
  - LAN access caused by user

### 7.17.9 Reset Subcode 72 = Alarm SMS Test

This command is used to trigger a fake alarm which causes a send of an SMS to test proper function of SMS Alarm notification.

Request (Application Reset):

```
68 04 04 68 53/73 FD 50 72 ADstI AtxI ChS 16
      (ADstI = Alarm destination index (0x00...0x09),
      AtxI = Alarm Text Index (0x00...0x09))
```

Answer:

E5 (if the user verification is valid)

Remarks:

- This function is only feasible if a suitable GPRS Modem is connected and properly set up. Also enough mobile network signal strength is necessary.
- Function can not be triggered if:
  - Alarm SMS sending already busy
  - FTP Upload via GPRS is in progress
  - GSM Modem access caused by user

### 7.17.10 Reset Subcode 73 = Alarm M-Bus Action Test

This command is used to trigger a fake alarm which causes an M-Bus action to test proper function of M-Bus Alarm parameters in an M-Bus Action Item.

Request (Application Reset):

```
68 04 04 68 53/73 FD 50 73 AActI ChS 16
      (AActI = Alarm Action Index (0x00...0x64))
```

Answer:

E5 (if the user verification is valid)

### 7.17.11 Reset Subcode A1 = Clear Data Logger Memory

All data logger values in ring memory will be cleared.

Request (Application Reset):

```
68 04 04 68 53/73 FD 50 A1 ChS 16
```

Answer:

E5 (if the user verification is valid)

### **7.17.12 Reset Subcode A3 = Clear Alarm M-Bus Action List**

The Alarm M-Bus Action list in non volatile memory will be cleared.

Request (Application Reset):

68 04 04 68 53/73 FD 50 A3 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.13 Reset Subcode A4 = Clear Alarm Destination List**

The Alarm Destination List in non volatile memory will be cleared.

Request (Application Reset):

68 04 04 68 53/73 FD 50 A4 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.14 Reset Subcode A5 = Clear Alarm Text List**

The Alarm Text List in non volatile memory will be cleared.

Request (Application Reset):

68 04 04 68 53/73 FD 50 A5 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.15 Reset Subcode E0 = RSP\_UD containing GPRS Provider**

All subsequent REQ\_UD2 requests are answered using a RSP\_UD telegram containing GPRS Provider data (7.25).

Request (Application Reset):

68 04 04 68 53/73 FD 50 E0 ChS 16

Answer:

E5 (if the user verification is valid)

### **7.17.16 Reset Subcode E1 = RSP\_UD containing FTP Server**

All subsequent REQ\_UD2 requests are answered using a RSP\_UD telegram containing FTP Server settings data (7.26).

Request (Application Reset):

68 04 04 68 53/73 FD 50 E1 ChS 16

Answer:

E5 (if the user verification is valid)

### 7.17.17 Reset Subcode E2 = RSP\_UD containing FTP Upload Cycle

All subsequent REQ\_UD2 requests are answered using a RSP\_UD telegram containing FTP upload cycle settings data (7.27).

#### Request (Application Reset):

68 04 04 68 53/73 FD 50 E2 ChS 16

#### Answer:

E5 (if the user verification is valid)

### 7.17.18 Reset Subcode E3 = RSP\_UD containing E-Mail Server

All subsequent REQ\_UD2 requests are answered using a RSP\_UD telegram containing E-Mail Server settings data (7.28).

#### Request (Application Reset):

68 04 04 68 53/73 FD 50 E3 ChS 16

#### Answer:

E5 (if the user verification is valid)

## 7.18 Retrieving Data Logger Values using Special RSP\_UD

The data logger values of the IZAR CENTER MEMORY can be retrieved using different commands. This command delivers each M-Bus Slave telegram stored in the data logger memory individually wrapping it in a special RSP\_UD telegram as shown below. The transmission starts always with the most current (newest) data logger entry. The transmission stops if the number of days/minutes/hours to read (7.3) is reached or the user has interrupted the transmission. As long as more data values are available the IZAR CENTER sends the M-Bus flag "more data in next telegram" and requests readout with this. The user verification must be valid.

#### Request 1 (Application Reset, Subcode 10):

68 04 04 68 53/73 FD 50 10 ChS 16

#### Answer 1:

E5 (if the user verification is valid)

#### Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

#### Answer 2 (RSP-UD):

D8 3E 00 3E 00 D8 08 FD 72 SAd0 SAd1 SAd2 SAd3 24 23 90 0E 2B 00 00 00  
1F (M-Bus flag: manufacturer specific data + more data in next telegram)

48 59 43 ("HYC", sign for HYDRO-CENTER data logger values)

(The next part contains the automatically read M-Bus Slave telegram from the data logger memory)

68 1C 1C 68 08 00 72 50 28 08 99 C4 15 01 03 34 00 00  
00 06 16 41 7F 00 00 00 00 02 96 28 01 00 41 16

0E 28 16 1A (Timestamp of telegram, M-Bus coded type F, 2008-10-22 08:14)

28 00 (Length of telegram, sign, length field and timestamp included)

48 59 43 ("HYC", sign for HYDRO-CENTER data logger values)

ChS 16

Request 3 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 3 (RSP-UD):

D8 10 00 10 00 D8 08 FD 72 SAd0 SAd1 SAd2 SAd3 24 23 90 0E 2E 00 00 00

0F (M-Bus flag: manufacturer specific data without  
more data in next telegram)

ChS 16

Remarks:

- The special RSP\_UD is different from the standard RSP\_UD telegram in respect of its startbyte (D8 instead of 68). Additionally, there is a 2 byte length field (LSB first) instead of 1 byte. Therefore, the maximum length of a telegram may be 64 KByte.
- As long as an answer 2 is received on a REQ\_UD2 request another REQ\_UD2 must be sent to readout the next telegram (which means as long as M-Bus flag 1F = "manufacturer specific data and more data in next telegram" is received).
- The IZAR CENTER is only reading the M-Bus Slaves and stores the received M-Bus telegram into the data logger memory. There is no M-Bus data interpretation. Only the timestamp and a length field is stored in addition to the plain M-Bus Slave telegram. The user has to interpret the M-Bus Slave telegrams himself and check for any errors.

## 7.19 Retrieving Data Logger Values using Standard RSP\_UD

The data logger values of the IZAR CENTER Memory can be retrieved using different commands. This command delivers each M-Bus Slave telegram stored in the data logger memory individually wrapping it in a standard RSP\_UD telegram as shown below. The transmission starts always with the most current (newest) data logger entry. The transmission stops if the number of days/hours/minutes to read (7.3) is reached or the user has interrupted the transmission. As long as more data values are available the IZAR CENTER sends the M-Bus flag "more data in next telegram" and requests another readout with this. The user verification must be valid.

Request 1 (Application Reset, Subcode 20):

68 04 04 68 53/73 FD 50 20 ChS 16

Answer 1:

E5 (if the user verification is valid)

Anfrage 2 (REQ-UD2):

10 7B/5B FD ChS 16

Antwort 2 (RSP-UD):

68 3E 3E 68 08 FD 72 SAd0 SAd1 SAd2 SAd3 24 23 90 0E 2B 00 00 00

1F (M-Bus flag: manufacturer specific data + more data in next telegram)

48 59 43 ("HYC", sign for HYDRO-CENTER data logger values)

(The next part contains the automatically read M-Bus Slave telegram from  
the data logger memory)

68 1C 1C 68 08 00 72 50 28 08 99 C4 15 01 03 34 00 00

00 06 16 41 7F 00 00 00 00 02 96 28 01 00 41 16

0E 28 16 1A (Timestamp of telegram, M-Bus coded type F, 2008-10-22 08:14)

28 00 (Length of telegram, sign, length field and timestamp included)

48 59 43 ("HYC", sign for HYDRO-CENTER data logger values)

ChS 16

Request 3 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 3 (RSP-UD):

68 10 10 68 08 FD 72 SAd0 SAd1 SAd2 SAd3 24 23 90 0E 2E 00 00 00 0F  
(M-Bus flag: manufacturer specific data without more data in next telegram)

ChS 16

Remarks:

- This command sends a standard RSP\_UD instead of a special RSP\_UD as in 7.18. The advantage is that only M-Bus standard transmissions are used and software not capable of working with special RSP\_UD can also read the data logger memory. The disadvantage is that M-Bus slave telegrams longer than approx. 220 byte are shortened since the complete telegram may only be 262 bytes in length.
- As long as an answer 2 is received on a REQ\_UD2 request another REQ\_UD2 must be sent to readout the next telegram (which means as long as M-Bus flag 1F = "manufacturer specific data and more data in next telegram" is received).
- The IZAR CENTER is only reading the M-Bus Slaves and stores the received M-Bus telegram into the data logger memory. There is no M-Bus data interpretation. Only the timestamp and a length field is stored in addition to the plain M-Bus Slave telegram. The user has to interpret the M-Bus Slave telegrams himself and check for any errors.

## 7.20 Retrieving the Device List

The IZAR CENTER device list can be read out as follows:

Request 1 (Application Reset, Subcode 60):

68 04 04 68 53/73 FD 50 60 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 50 50 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 90 0E 03 00 00 00  
1F (M-Bus flag: manufacturer specific data +more data in next telegram)  
(Device list entry, coding described in 7.10)

00 00 0F 00 78 56 34 12 24 23 04 26 FF FF FF FF 00 1F 02 52 00 FF FF FF FF FF FF  
FF  
FF 00 02 54 65 73 74 20  
31 FF  
FF  
FF  
FF FF FF FF FF 00  
00  
00  
ChS 16

Request 3 (REQ-UD2):  
10 7B/5B FD ChS 16

Answer 3 (RSP-UD):

68 50 50 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 90 0E 03 00 00 00  
0F

(M-Bus flag: manufacturer specific data without more data in next telegram)

(Device list entry, coding described in 7.10)

01 00 0F 00 21 43 65 87 24 23 04 28 FF FF FF FF 00 1F 02 52 0A 68 04 04 68 73 FD  
50 00 C0 16 FF  
FF  
32 FF  
FF  
FF  
FF  
00  
00  
00  
ChS 16

Remarks:

- As long as an answer 2 is received on a REQ\_UD2 request another REQ\_UD2 must be sent to readout the next telegram (which means as long as M-Bus flag 1F = "manufacturer specific data and more data in next telegram" is received).
- Each RSP\_UD telegram contains exactly one device list entry. The coding of the device list entry is described in 7.10.

## 7.21 Retrieving Alarm M-Bus Action List

The IZAR CENTER Alarm M-Bus Action List can be read out as follows:

Request 1 (Application Reset, Subcode 61):  
68 04 04 68 53/73 FD 50 61 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 03 00 00 00  
1F

(M-Bus flag: manufacturer specific data +more data in next telegram)

00 01 (Alarm action item telegram)

(Alarm M-Bus Action list entry, coding described in 7.12)

00 78 56 34 12 24 23 0E 97 00 00 00 00 00 1F 02 52 02 29 68 23 23 68 73 FD 51 01  
7A FF 07 79 FF FF FF FF 24 23 97 0E 41 FD 1A 01 81 01 FD 1A 00 C1 40 FD 1A 01 81  
41 FD 1A 00 87 16 0A 53 77 69 74 63 68 50 75 6D 70

Chs 16

Request 3 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 3 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 03 00 00 00  
0F

(M-Bus flag: manufacturer specific data without more data in next telegram)

00 01 (Alarm action item telegram)  
 (Alarm M-Bus Action list entry, coding described in 7.12)  
 01 78 56 34 12 24 23 0E 97 00 00 00 00 00 1F 02 52 02 29 68 23 23 68 73 FD 51 01  
 7A FF 07 79 FF FF FF FF 24 23 97 0E 41 FD 1A 01 81 01 FD 1A 00 C1 40 FD 1A 01 81  
 41 FD 1A 00 87 16 0A 53 77 69 74 63 68 50 75 6D 70

Chs 16

Remarks:

- As long as an answer 2 is received on a REQ\_UD2 request another REQ\_UD2 must be sent to readout the next telegram (which means as long as M-Bus flag 1F = "manufacturer specific data and more data in next telegram" is received).
- The complete list contains 100 items. Therefore REQ-UD2 may be sent up to 100 times to retrieve complete list.
- Each RSP\_UD telegram contains exactly one alarm M-Bus action list entry. The coding of the alarm M-Bus action entry is described in 7.12.

## 7.22 Retrieving Alarm Destination List

The IZAR CENTER Alarm Destination List can be read out as follows:

Request 1 (Application Reset, Subcode 62):

68 04 04 68 53/73 FD 50 62 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 03 00 00 00  
 1F (M-Bus flag: manufacturer specific data +more data in next telegram)  
 00 02 (Alarm destination item telegram)  
 (Alarm destination list entry, coding described in 7.14)  
 00 78 56 34 12 24 23 0E 97 00 00 00 00 00 1F 02 52 02 29 68 23 23 68 73 FD 51 01  
 7A FF 07 79 FF FF FF FF 24 23 97 0E 41 FD 1A 01 81 01 FD 1A 00 C1 40 FD 1A 01 81  
 41 FD 1A 00 87 16 0A 53 77 69 74 63 68 50 75 6D 70

Chs 16

Request 3 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 3 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 03 00 00 00  
 0F (M-Bus flag: manufacturer specific data without more data in next telegram)  
 00 01 (Alarm action item telegram)  
 (Alarm M-Bus Action list entry, coding described in 7.12)  
 01 78 56 34 12 24 23 0E 97 00 00 00 00 00 1F 02 52 02 29 68 23 23 68 73 FD 51 01  
 7A FF 07 79 FF FF FF FF 24 23 97 0E 41 FD 1A 01 81 01 FD 1A 00 C1 40 FD 1A 01 81  
 41 FD 1A 00 87 16 0A 53 77 69 74 63 68 50 75 6D 70

Chs 16

Remarks:

- As long as an answer 2 is received on a REQ\_UD2 request another REQ\_UD2 must be sent to readout the next telegram (which means as long as M-Bus flag 1F = "manufacturer specific data and more data in next telegram" is received).
- The complete list contains 10 items. Therefore REQ-UD2 may be sent up to 10 times to retrieve complete list.
- Each RSP\_UD telegram contains exactly one alarm destination list entry. The coding of the destination list entry is described in 7.14).

## 7.23 Retrieving Alarm Text List

The IZAR CENTER Alarm Text List can be read out as follows:

Request 1 (Application Reset, Subcode 63):

68 04 04 68 53/73 FD 50 63 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 03 00 00 00  
1F (M-Bus flag: manufacturer specific data +more data in next telegram)  
00 03 (Alarm text item telegram)  
(Alarm text list entry, coding described in 7.16)  
00 10 4D 79 20 41 6C 61 72 6D 20 4D 65 73 73 61 67 65  
Chs 16

Request 3 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 3 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 04 00 00 00  
0F (M-Bus flag: manufacturer specific data without more data in next telegram)  
00 03 (Alarm text item telegram)  
(Alarm text list entry, coding described in 7.16)  
01 17 4D 79 20 53 65 63 6F 6E 64 20 41 6C 61 72 6D 20 4D 65 73 73 61 67 65  
Chs 16

Remarks:

- As long as an answer 2 is received on a REQ\_UD2 request another REQ\_UD2 must be sent to readout the next telegram (which means as long as M-Bus flag 1F = "manufacturer specific data and more data in next telegram" is received).
- The complete list contains 10 items. Therefore REQ-UD2 may be sent up to 10 times to retrieve complete list.
- Each RSP\_UD telegram contains exactly one alarm text list entry. The coding of the alarm text list entry is described in 7.16).

## 7.24 Retrieving LAN Interface TCP/IP Settings

The IZAR CENTER LAN interface TCP/IP settings can be read out as follows:

Request 1 (Application Reset, Subcode 65):

68 04 04 68 53/73 FD 50 65 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 04 00 00 00  
0F (M-Bus flag: manufacturer specific data without more data in next telegram)  
00 0B (TCP/IP settings telegram)  
(TCP/IP settings telegram data, coding described in 6.14)  
C0 A8 00 64 08 00 00 00 00 11 27 0B 49 5A 41 52 5F 43 45 4E 54 45 52 00 00 00 00  
Chs 16

## 7.25 Retrieving GPRS Connection Settings

The IZAR CENTER GPRS connection settings can be read out as follows:

Request 1 (Application Reset, Subcode E0):

68 04 04 68 53/73 FD 50 E0 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 04 00 00 00  
0F (M-Bus flag: manufacturer specific data without more data in next telegram)  
00 05 (GPRS connection settings telegram)  
(GPRS connection settings telegram data, coding described in 7.5)  
15 69 6E 74 65 72 6E 65 74 2E 79 6F 75 72 70 72 6F 76 69 64 65 72 04 75 73 65 72  
04 70 61 73 73  
Chs 16

## 7.26 Retrieving FTP Server Settings

The IZAR CENTER FTP Server settings can be read out as follows:

Request 1 (Application Reset, Subcode E1):

68 04 04 68 53/73 FD 50 E1 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 04 00 00 00

1F (M-Bus flag: manufacturer specific data + more data in next telegram)

00 06 (FTP Server settings telegram)

(FTP Server settings telegram data, coding described in 7.6)

00 10 77 77 77 2E 6D 79 73 65 72 76 65 72 2E 63 6F 6D 04 75 73 65 72 04 70 61 73  
73 06 2F 6D 79 44 69 72

Chs 16

Remarks:

- Answer 2 will contain Main FTP Server
- Repeat request 2 again to retrieve Backup FTP Server settings

## 7.27 Retrieving FTP Upload Cycle Settings

The IZAR CENTER FTP upload cycle settings can be read out as follows:

Request 1 (Application Reset, Subcode E2):

68 04 04 68 53/73 FD 50 E2 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 04 00 00 00

0F (M-Bus flag: manufacturer specific data without more data in next telegram)

00 08 (FTP upload settings telegram)

(FTP upload settings telegram data, coding described in 7.7)

0F 00 01 00 00 00 00 00 00 03 00

Chs 16

## 7.28 Retrieving E-Mail Server Settings

The IZAR CENTER E-Mail server settings can be read out as follows:

Request 1 (Application Reset, Subcode E3):

68 04 04 68 53/73 FD 50 E3 ChS 16

Answer 1:

E5 (if the user verification is valid)

Request 2 (REQ-UD2):

10 7B/5B FD ChS 16

Answer 2 (RSP-UD):

68 Len Len 68 08 FD 72 SAD0 SAD1 SAD2 SAD3 24 23 93 0E 04 00 00 00  
1F (M-Bus flag: manufacturer specific data + more data in next telegram)  
00 09 (E-Mail server settings telegram)  
00 (Reserved)  
(E-Mail server settings telegram data, coding described in 7.8)  
0E 77 77 77 2E 6D 61 69 6C 70 6F 70 2E 64 65 0E 77 77 77 2E 73 6D 74 70 75 72 6C  
2E 64 65 07 70 6F 70 75 73 65 72 08 73 6D 74 70 75 73 65 72 04 70 61 73 73 15 4D  
61 69 6C 20 66 72 6F 6D 20 49 5A 41 52 20 43 45 4E 54 45 52

Chs 16

Remarks:

- Retrieving of another telegram by sending another REQ-UD2 will return a empty manufacturer specific telegram (reserved for future use)

## 8 Alarming functions

As already described above IZAR CENTER MEMORY devices are able to watch incoming meter values and do some action if alarm condition becomes true.

However IZAR CENTER supports three alarm classes:

- Status Byte: The M-Bus status byte of the slave can be checked if slave shows some errors (bitmask)
- Instantaneous: Watch a instantan value of the slave (e.g. return temperature). A list of supported M-Bus VIFs can be found at 8.1
- Consumption alarm: A counter value of the slave (e.g. forward volume) can be watched. IZAR CENTER will calculate consumption. Because of consumption alarms are performance and memory espensive only 20 consumption alarms can be specified totally.

Depending on the class which is choosed IZAR CENTER interprets alarm threshold value in different ways. For each device list item (M-Bus slave to automatically readout) up to 2 alarm items can be specified. The settings for the alarm are part of the devicelist item itself.

As a threshold value for each alarm at maximum a 64 bit value can be processed by IZAR CENTER. Each of the two alarms per slave can individually set to watch for over- or underflow condition. Thus alarm condition can be true if threshold value either is over or- underflowed.

If alarm condition is true up to three actions can be performed:

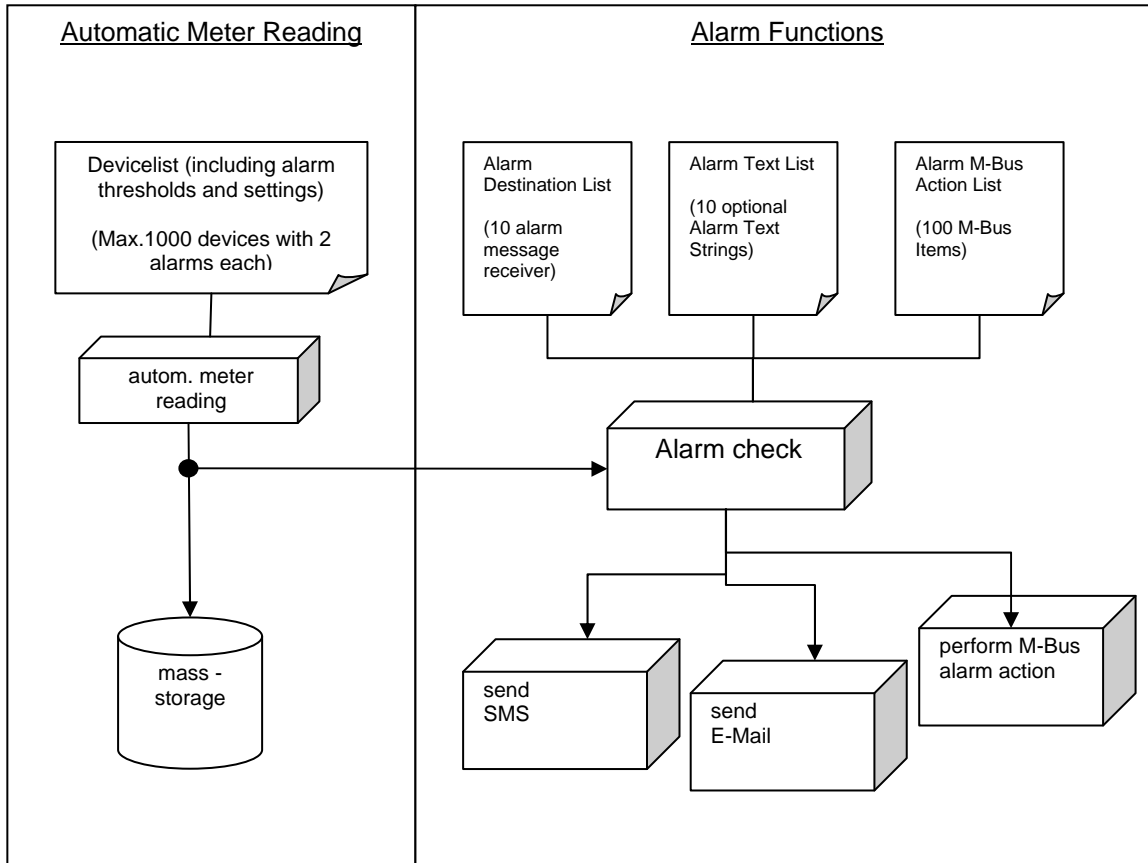
- SMS alarm notification (special GPRS modem needed)
- E-Mail alarm notification
- M-Bus action (execute a M-Bus command to a dedicated device)

Therefore three alarm lists are necessary:

- Alarm destination list: Contains information about the receiver of an alarm notification
- Alarm text list: Contains optional, additional text strings which can be concatenated to the alarm message
- Alarm M-Bus action list: Similar to a device list it contains information about how to reach a slave (e.g. addressing, baudrate) and which M-Bus command to send to the device.

Depending on the action(s) to perform also each alarm in the devicelist item has an index to each alarm list (e.g. to choose alarm message receiver).

Following figure will show dependencies and list structures:



## 8.1 Recommended Modem Types

For the IZAR CENTER following modems are recommended and can be purchased by HYDROMETER:

Manufacturer	Model	Type	HY-Art. Nr.
xmodus	XM1210S	GPRS	30 057 87
xmodus	XM1220S	Analog	544 003 04

To use FTP Upload and alarm SMS functions XM1210S modem must be used.

## 8.2 Structure of alarm Message (SMS and E-Mail)

Alarm messages can contain up to 160 characters at maximum. The structure of alarm messages will be shown in the examples below.

### 8.2.1.1 Statusbyte alarm

Alarm messages caused by checking statusbyte in M-Bus telegram are structured as follows.

Example:

```
Sharky 504566711 [2]: Alarm in meter state(30) Status alarm  
|----- (a) -----| (b) |----- (c) -----| |--- (d) -----|
```

- (a) Meter descriptor string. If not defined meter secondary address will be used instead
- (b) Alarm number; [1] or [2]
- (c) Alarm indikator; in braces value of status byte is returned as hexadecimal value.
- (d) Alarm text

### 8.2.1.2 Instantaneous

A alarm messages caused by an instantaneous value over- or underflow are structured as follows:

Example:

```
Sharky 34548085 [1]: 23.400000 > 20.000000 oC  
|----- (a) ---| (b) |----- (c) ----| (d)  
Temperatur overflow  
|----- (e) -----|
```

- (a) Meter descriptor string. If not defined meter secondary address will be used instead.
- (b) Alarmnumber; [1] or [2]
- (c) Alarm condition; configured threshold is 20°C, measured value is 23,4°, alarm condition was set to "overflow"
- (d) M-Bus VIF unit, if supported (see also 8.3)
- (e) Alarm text (if defined)

### 8.2.1.3 Consumption alarm

A consumption alarm leads to similar alarm message as on an instantaneous alarm.

Example:

```
Sharky 504566711 [1]: 0.300000 > 0.240000 m3 Verbrauch zu gross  
|----- (a) ----| (b) |----- (c) ----| (d) |----- (e) ----|
```

- (a) Meter descriptor string. If not defined meter secondary address will be used instead.
- (b) Alarmnumber; [1] or [2]
- (c) Alarm condition; configured threshold is 0.24 m<sup>3</sup>, measured value is 0.30 m<sup>3</sup>, alarm condition was set to "overflow"
- (d) M-Bus VIF unit, if supported (see also 8.3)

(e) Alarm text (if defined)

## 8.3 FTP Upload functions

As described above IZAR CENTER MEMORY is able to perform an automatic upload of logger data on a dedicated FTP server. The logger data therefore will be exported to an xml file on the FTP server.

### 8.3.1.1 File name of meter data

The file name used to write meter data on the FTP server during upload consists of three parts: mac-address, decimal number (0..999) and extension (".xml").

The MAC address and the number are separated by an underscore ('\_').

The MAC address is a 6 byte value, each byte presented as hexadecimal ASCII value, e.g.: 0007E9013A7F. It is extracted from the ethernet interface module.

Literals are in uppercase.

Example filename: "0007E9013A7F\_001.xml"

The number starts at 0 at initial IZAR CENTER powerup and is increased every FTP upload. When reaching 999 the next used number is 0. Each number is expanded to 3 digits, meaning leading zeroes if required.

The restriction to 3 digits for the number results in the fact that using a large number of files on the FTP server makes retrieval of files slow. Also the number of files possible in one directory is limited by the FTP server.

As it's possible to store files of multiple IZAR CENTER devices in one directory, every IZAR CENTER will contribute with 2000 files in the directory. The structure of a IZAR CENTER xml file is shown at 8.4

### 8.3.1.2 File name of validation information

Additionally to the file stored with meter data one file is created with the same prefix to validate uploaded meter data.

The second file uploaded uses the extension ".rdy".

It only contains the string "OK\n\r" (4 bytes).

This file is used to signal external SW (e.g. running on a remote site) trying to read data from FTP server, if the XML file going to be read is completely transmitted. Only if the corresponding XML file has been transmitted the matching RDY file is created.

This has been implemented due to backward compatibility only.

## 8.4 XML File structure

### 8.4.1 XML data types

The resulting XML file on the FTP server is build up of several types of XML tags and XML-tagged data. The XML typical start/end tags are supported.

### 8.4.2 Tag only

This is data that does not contain any variable information but only structures the XML data.

The XML body for the file is described as follows:

```

<?xml version="1.0" ?>
<HC2XML>
<UNIT>
..... device specific tags are located here
<MBADDRESS>
... .. complete M-Bus address of the device (ID, manufacturer, medium, generation)
</MBADDRESS>
</UNIT>

<MEM>
..... meter specific telegrams are located here
</MEM>
</HC2XML>

```

Tags listed above do not contain data in the same line, but start a block of data. One exception is the first line which denotes the xml version (<?xml version="1.0" ?>).

### 8.4.3 Tagged variables (unit)

A total of 16 IZAR CENTER variables is provided in the unit-section of the file.

Type	Tag	Example
HW version	<HVERS>	<HVERS>1001</HVERS>
Firmware version	<FVERS>	<FVERS>1005</FVERS>
IZAR CENTER type	<TYPE>	<TYPE>250M</TYPE>
M-Bus manufacturer	<MBMAN>	<MBMAN>2423</MBMAN>
M-Bus generation	<MBGE>	<MBGE>93</MBGE>
M-Bus medium	<MBME>	<MBMEDIUM>0E</MBME>
M-Bus address	<MBDEVICEID>	<MBDEVICEID>12345678</MBDEVICEID>
Uptime (in seconds)	<UPTIME>	<UPTIME>0004C06D</UPTIME>
Time (actual upload time)	<MBTIME>	<MBTIME>0004C76D</MBTIME>
M-Bus current	<IMBUS>	<IMBUS>15205</IMBUS>
M-Bus voltage	<VMBUS>	<VMBUS>3825</VMBUS>
M-Bus high voltage	<VHIGHBUS>	<VHIGHMBUS>3910</VHIGHMBUS>
M-Bus low voltage	<VLOWBUS>	<VLOWMBUS>2430</VLOWMBUS>
IP address of LAN interface	<IPADDR>	<IPADDR>C0A83C01</IPADDR>
The LAN IP port	<IPPORT>	<IPPORT>02D0</IPPORT>
Last upload time	<MBTIMELUPL>	<MBTIMELUPL>0004206D</MBTIMELUPL>
Alarm state	<STATE>	<STATE>023E</STATE>
Modem baudrate	<MODEMBDR>	<MODEMBDR>19200</MODEMBDR>
GPRS signal strength	<GPRSRSSI>	<GPRSRSSI>30</GPRSRSSI>
Alarm state	<ALMSTATE>	<ALMSTAT>01</ALMSTAT>

### 8.4.4 Tag attributes

The main block specifying the device related information supports XML attributes for 'FORMAT' and some tags additionally 'UNIT' attributes.

The supported FORMAT-attributes are

- HEX : hexadecimal value, e.g. 093E = 0x093E = 2366(dec)
- MBUSHEX : hexadecimal value with LSByte first, e.g. 06000300 = 0x00030006
- STRING : ASCII string, e.g. 250M

Some tags additionally support the unit attributes, these are

- IMBUS : unit "mA"

- VMBUS, VHIGMBUS, VLOWMBUS : unit "10mV"
- UPTIME : unit "sec"

## 8.4.5 Tagged meter data

Every meter telegram stored in the IzarCenter is converted to a telegram block in the final XML file. Starting with the telegram number, followed by a M-Bus timestamp and the meters alarm state the raw meter telegram is added with a dedicated tag. The structure is shown below:

```
<T0000>
<TIME> M-Bus timestamp</TIME>
<ALMSTAT> hexByte</ALMSTAT>
<MTEL> telegram data in ASCII-hex</MTEL>
</T0000>
```

The telegram number is provided in ASCII hex (range 0000...FFFF) providing up to 65536 telegram entries in the XML file (example: T00CE = telegram number 206).

The alarm state byte will signal the meters 2 possible alarms. Alarm 1 is bit-coded at position 0x01 Alarm 2 on Position 0x02. If both Alarms have been detected a '03' is placed in the XML file.

The M-Bus telegram data is coded as 2 ASCII chars for one byte, e.g. data 0x03 is converted to "03" (0x30 0x33).

## 8.4.6 Example XML file

```
<?xml version="1.0" ?>
<HC2XML>
<UNIT>
<HVERS FORMAT="HEX">01</HVERS>
<FVERS FORMAT="HEX">08</FVERS>
<TYPE FORMAT="STRING">250M</TYPE>
<MBADDRESS>
<MBDEVICEID FORMAT="MBUSHEX">12345678</MBDEVICEID>
<MBMAN FORMAT="MBUSHEX">2423</MBMAN>
<MBGE FORMAT="MBUSHEX">93</MBGE>
<MBME FORMAT="MBUSHEX">0E</MBME>
</MBADDRESS>
<UPTIME FORMAT="HEX">0004C06D</UPTIME>
<MBTIME FORMAT="MBUSHEX">11101F13</MBTIME>
<IMBUS FORMAT="HEX" UNIT="mA">1520</IMBUS>
<VMBUS FORMAT="HEX" UNIT="10mV">3825</VMBUS>
<VHIGMBUS FORMAT="HEX" UNIT="10mV">3910</VHIGMBUS>
<VLOWMBUS FORMAT="HEX" UNIT="10mV">2430</VLOWMBUS>
<IPADDR FORMAT="HEX">C0A83C01</IPADDR>
<IPPORT FORMAT="HEX">02D0</IPPORT>
<MBTIMELUPL FORMAT="MBUSHEX">11101E13</MBTIMELUPL>
<STATE FORMAT="HEX">023E</STATE>
<MODEMBDR FORMAT="HEX">00004B00</MODEMBDR>
<GPRSRSSI FORMAT="HEX">3C</GPRSRSSI>
</UNIT>
<MEM>
<T0000>
<MBTIME>0A101F13</MBTIME>
<ALMSTAT>00</ALMSTAT>
<MTEL>684040680800722990842924233A079D0000000C15020000008C1013530200000C3B000000
008C2015020000008C301500000000046D230AE6074C1500000000426CDF0C8C16</MTEL>
</T0000>
```

```

<T0001>
<MBTIME>0B101F13</MBTIME>
<ALMSTAT>00</ALMSTAT>
<MTEL>684040680800722990842924233A079D0000000C15020000008C1013530200000C3B000000
008C2015020000008C301500000000046D230AE6074C1500000000426CDF0C8C16</MTEL>
</T0001>
</MEM>
</HC2XML>

```

## 8.5 List of supported VIFs for alarm functions

VIF (value in hex)	Description	Printed Unit
00 .. 07	Energy	Wh
08 .. 0F	Energy	J
10 .. 17	Volume	m <sup>3</sup> (m <sup>3</sup> )
18 .. 1F	Mass	kg
20	On Time	sec (seconds)
21		min (minutes)
22		hours
23		days
24	Operating Time	sec (seconds)
25		min (minutes)
26		hours
27		days
28 .. 2F	Power	W
30 .. 37	Power	J/h
38 .. 3F	Volume Flow	m <sup>3</sup> /h (m <sup>3</sup> /h)
40 .. 47	Volume Flow ext.	m <sup>3</sup> /min (m <sup>3</sup> /min)
48 .. 4F	Volume Flow ext.	m <sup>3</sup> /s (m <sup>3</sup> /s)
50 .. 57	Mass Flow	kg/h
58 .. 5B	Flow Temperature	oC (°C)
5C .. 5F	Return Temperature	oC (°C)
60 .. 63	Temperature Difference	K
64 .. 6F	External Temperature	oC (°C)
68 .. 6B	Pressure	mbar
70	Averaging duration	sec (seconds)
71		min (minutes)
72		hours
73		days
74	Actuality duration	sec (seconds)
75		min (minutes)
76		hours
77		days

# 9 Table of all M-Bus Commands

IZAR CENTER Functions Selection Telegrams						
Description	Telegram Type	CI	Address	Manufact.	Gen.	Medium
<a href="#">Selection</a>	SND_UD	52	Serial No.	23 24 (HYD)	90	0E
<a href="#">Selection Memory</a>	SND_UD	52	Serial No.	23 24 (HYD)	91	0E
<a href="#">Deselection</a>	SND_NKE		FD (253)			

IZAR CENTER Functions SND_UD Telegrams						
Description	Telegram Type	CI	DIB	VIB	Man Code	
<a href="#">Baudrate Switching M-Bus</a>	Baudrate	B8..BF				
<a href="#">Username Entry</a> (Only together with password)	SND_UD	51	04	FD 12		
<a href="#">Password Entry</a> (Only together with username)	SND_UD	51	04	FD 16		
<a href="#">Changing Username</a>	SND_UD	51	44	FD 12		
<a href="#">Changing Password</a>	SND_UD	51	44	FD 16		
<a href="#">Set Date and Time (Standard)</a>	SND_UD	51	04	6D		
<a href="#">Set Date and Time (Special)</a>	SND_UD	51	06	6D		
<a href="#">Set Cycle Time</a>	SND_UD	51	04	FD 25		
<a href="#">Set Days to Read</a>	SND_UD	51	04	FD 2F		
<a href="#">Set Hours to Read</a>	SND_UD	51	04	FD 2E		
<a href="#">Set Minutes to Read</a>	SND_UD	51	04	FD 2D		
<a href="#">Set GSM-PIN-Code</a>	SND_UD	51	04	FD 08		
<a href="#">Set User Data</a>	SND_UD	51	0D	FD 10		
<a href="#">Set RSP_UD Telegram</a>	SND_UD	51	05	FD 20		
<a href="#">Set Alarm M-Bus Action List</a>	SND_UD	51	0F/1F		00 01	
<a href="#">Set Alarm Destination List</a>	SND_UD	51	0F/1F		00 02	
<a href="#">Set Alarm Text List</a>	SND_UD	51	0F/1F		00 03	
<a href="#">Set Serial Interface</a>	SND_UD	51	0F		00 04	
<a href="#">Set GPRS Connection Settings</a>	SND_UD	51	0F		00 05	
<a href="#">Set FTP Servers</a>	SND_UD	51	0F/1F		00 06	
<a href="#">Set FTP Upload Cycle</a>	SND_UD	51	0F		00 08	
<a href="#">Set Mail Server</a>	SND_UD	51	0F		00 09	
<a href="#">Set LAN Interface TCP/IP</a>	SND_UD	51	0F		00 0B	
<a href="#">Get Date/Time (Special)</a>	SND_UD	51	0F		00 0D	
<a href="#">Set M-Bus Echo on/off</a>	SND_UD	51	0F		00 10	
<a href="#">Set Maintenance Mode on/off</a>	SND_UD	51	0F		00 11	

IZAR CENTER Functions Application Reset Telegrams					
Description	Telegram Type	CI	Code	Param	
<a href="#">Standard RSP_UD</a>	App. Reset	50	00		
<a href="#">Data Logger RSP_UD Special</a>	App. Reset	50	10		
<a href="#">Data Logger RSP_UD Standard</a>	App. Reset	50	20		
<a href="#">Device List RSP_UD</a>	App. Reset	50	60		
<a href="#">Get Alarm M-Bus Action List</a>	App. Reset	50	61		
<a href="#">Get Alarm Destination List</a>	App. Reset	50	62		

<a href="#">Get Alarm Text List</a>	App. Reset	50	63	
<a href="#">Get LAN TCP/IP Settings</a>	App. Reset	50	65	
<a href="#">Test FTP Upload</a>	App. Reset	50	70	
<a href="#">Test E-Mail Alarm</a>	App. Reset	50	71	TgtI, TxtI
<a href="#">Test SMS Alarm</a>	App. Reset	50	72	TgtI, TxtI
<a href="#">Test M-Bus Action Alarm</a>	App. Reset	50	72	ActI
<a href="#">Reset</a>	App. Reset	50	80	
<a href="#">Clear Data logger Memory</a>	App. Reset	50	A1	
<a href="#">Clear Alarm M-Bus Action List</a>	App. Reset	50	A3	
<a href="#">Clear Alarm Destination List</a>	App. Reset	50	A4	
<a href="#">Clear Alarm Text List</a>	App. Reset	50	A5	
<a href="#">Get GPRS Connection Settings</a>	App. Reset	50	E0	
<a href="#">Get FTP Servers</a>	App. Reset	50	E1	
<a href="#">Get FTP Upload Cycle</a>	App. Reset	50	E2	
<a href="#">Get E-Mail Server</a>	App. Reset	50	E3	

# 10 History of document

Date	Change
2009/02/26	Corrected intro text in 7.10 (Devicelist coding)
2009/10/28	Corrected length field in 7.8 (Devicelist write)