

# **HFM 3500D** **combined mobile RFID- and** **Barcode- hand held reader with** **cable connection**

## **Short Description**



## Note

This document is just for information about how to use the mobile combi device HFM 3500D from Leuze electronic. All important details about the functionality and the handling were described further on. In addition the typical connections together with the modular interfacing units (MA) are in this manual, too.

## Content

<b>DELIVERY CONTENTS .....</b>	<b>3</b>
<b>SAFETY NOTICES .....</b>	<b>4</b>
GENERAL SAFETY NOTICES.....	4
APPROVED PURPOSE .....	4
WORKING SAFELY .....	5
<b>INSTALLATION.....</b>	<b>6</b>
CONNECTING THE DEVICE .....	6
HOW IS THE BEST WAY TO SCAN OR READ?.....	7
<b>TECHNICAL DATA.....</b>	<b>8</b>
READ CHARACTERISTICS.....	9
<b>USING THE HFM 3500D.....</b>	<b>10</b>
FUNCTIONS.....	10
DEVICE RESET / FACTORY DEFAULT .....	12
PARAMETER SETTING .....	12
TELEGRAM- / COMMAND STRUCTURE.....	13
MENU STRUCTURE.....	14
HFM 3500D AT THE SERIAL PC-INTERFACE .....	17
HFM 3500D WITH MA 204I, MA208I OR MA248I .....	18
HFM 3500D WITH MA 21 (MULTINET) .....	18
HFM 3500D WITH USB (COM-PORT-EMULATION) .....	19
TRIGGERING /ACTIVATION .....	19
DIAGNOSTICS AND TROUBLE SHOOTING .....	20
<b>TYPE OVERVIEW .....</b>	<b>21</b>
<b>ACCESSORIES.....</b>	<b>21</b>

CONNECTION TO LEUZE MULTINET PLUS .....	22
CONNECTION TO PROFIBUS .....	22
CONNECTION TO PROFINET RT I/O .....	22
CONNECTION TO ETHERNET TCP/IP .....	22

## Delivery contents

### HFM 3500D

1. Mobile combi RFID + Barcode-Hand held reader
2. RS232-spiral cable, length 4m
3. Bypack paper



# Safety Notices

## General Safety Notices

All entries in this technical description must be needed, in particular the present chapter „General Safety Notices“. Keep this technical description in a safe place.

### **Safety regulations**

Observe the locally applicable regulations and the rules of the employee´s liability insurance association.

### **Repairs**

Repairs must only be carried out by the manufacturer or an authorized representative.

## Approved purpose

*Attention! The protection of personnel and the device cannot be guaranteed if the device is operated in a manner not complying with its intended use.*

*Combined mobile Barcode and RFID readers of the HFM 35x0D series are conceived as mobile devices With integrated decoder for manual object identification with typical barcodes and HF transponders.*

*In particular unauthorized uses include:*

- *Rooms with explosive atmosphere*
- *Operation for medical purposes*

### **Areas of application**

The combined mobile devices HFM 35x0D are designed for the following areas of application:

- Storage and conveying technologies for manual object identification
- Manual commissioning areas

## Working safely

*Attention! Access to or changes on the device, except where expressly described in this document, are not authorized.*

### Qualified personnel

Mounting, commissioning and maintenance of the device must only be carried out by qualified personnel. Electrical work must only be carried out by a certified electrician.



### Attention Laser radiation!

If you look into the beam path over a longer time period, the retina of your eye may be damaged. Never look directly into the beam path! Do not point the beam at persons!

The combi devices HFM 35x0D comply to the safety standards EN60825 for a class 2 product.

The HFM35x0D uses a low power visible laser diode. The average laser power is less than 1mW in accordance with the definition of class 2 lasers. The scanner window is the only aperture through which laser light may be observed on this product. The laser is activated after pressing the trigger button.

# Installation

## Connecting the device

The following paragraph describes all steps to get the device connected. The RS232-cable is fixed at the device.

### Switch off of computer or PLC

*Information about switching and shut down the computer /PLC correctly you'll find inside the manual. This should always been done because of safety reasons before a new device is going to be installed.*

### Connecting the device cable to the PC/PLC

1. Connect the 9pol SUB-D to the interface cable to the suitable socket of the PC/PLC. If you are using a RS232-USB-cable converter, the converter cable is just plugged into the 9-pol Sub D of the standard RS232-cable.
2. The Standard RS232-cable allows either to use a separate Power supply (NT Hx5x0, 50110676), or using via PIN9 of the cable a power supply inside the PLC. The pinning is printed further on
3. Plug in the power supply into a power socket 100-230VAC (not necessary when PIN9 is used).
4. To switch „On“ the device please press the ‚OK‘ key. As soon the display shows the functions selection the device is ready to use. The GREEN LED (above left edge of display) is ON, too.
5. With the black marked keys the function is selected and with the yellow marked key activated. Settings for data output, code types etc. can be set in the ‚system‘ area (right yellow key).

## How is the best way to scan or read?

Here we give you some advices for best case scan or read operations:

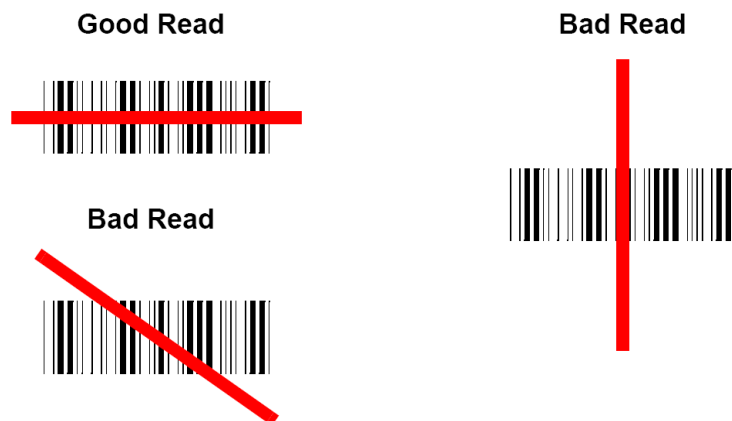
The Scanner should be held with alight angle to the code. (Don't used it in 90° to the Code, because you get total reflexion and read failure.)

The red LED-Line is an aimer and should be held onto the code. The Scanner cannot identify the label correctly, if it's not complete within the red line.

The red LED-Line is smaller and narrow if the device is close to the code. Codes with small and thin bars should be read with a smaller distance, for larger codes the distance should be bid enough to have the Complete code within the red line.

For reading the RFID tag, the environment should have less possible metal and the device should be held very close above the tag.

The antenna of the device should cover over 70%.of the tag to have good conditions for reading it.



### Test barcode

The printed code is to test the functionality of the scanner, module(bar) width is 0.5 mm (20 mil)



### Code 39 Bar Code Sample

# Technical Data

## Electrical Data

RFID	
Frequency	13.56MHz (ISO15693)
Read-/Write range	max. 30mm*
Antenna size	80x60mm

BARCODE	
1D-Laser	Red light – Laser
Code types	linear Barcodes
Range	max. 450mm**
Module	0.2 to 1mm

Power Supply	4.5-6VDC, PIN9 /ext. Power
--------------	----------------------------

## Interface

Interface type	RS232, 9pin Sub-D
Emulation	USB-COM-Port with converter cable

## Code and Transponder types

readable Barcodes	Code 39, Code 128, Code 93 EAN 8/13, 2/5 Int. after release
readable Transponder	Phillips I-Code SLI, Texas TAG IT HFI,

## Mechanical Data

Display	OLED (128x64)
Key board	19 keys
Weight	172 g (without cable)
Dimensions	135 x 104 x 145 mm
Material	ABS, silver grey
Connction	spiral cable 4m

## Environmental Data

Valid Standards	EN 301489-3 EN 300220-1 EN 302208-1 IEEE 802.15.1
-----------------	--

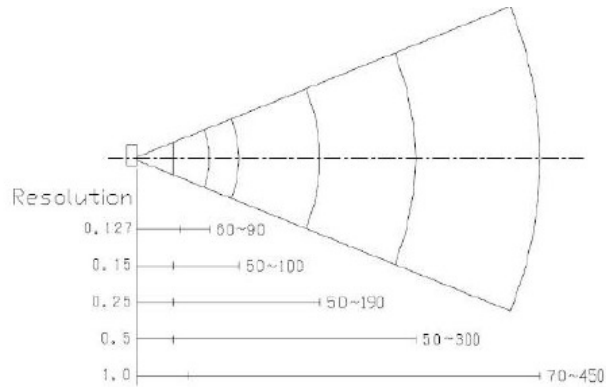
Laser Class 2	IEC 60825-1
---------------	-------------

Protection class	IP54
Temperature (operation)	-20 to 50 °C
(storage)	-20 to 50 °C



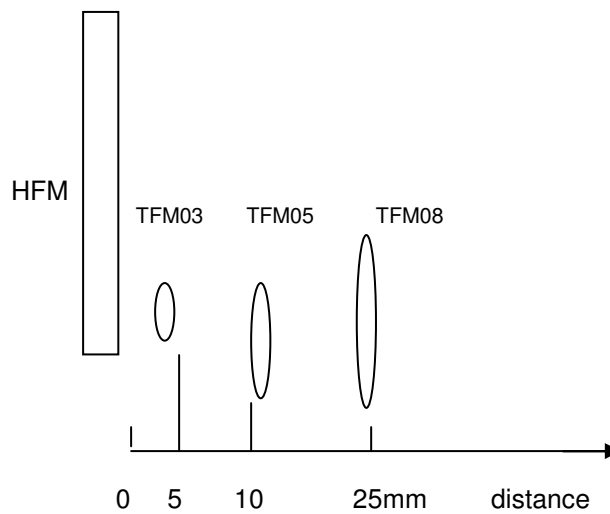
## Read Characteristics

Working area Laser



Readable Barcode-Types (Release per selecting, \* factory set)  
 Code 39\*, Code 128\*, EAN-13\*, UPC-A, EAN-8\*, UPC-E, Interleaved 2/5\*  
 Codabar, Code 93\*, Chinese 2/5, Codablock F\*, ITF-6, ITF-14,  
 No of digits: range 1-255  
 Modul: recommended 0.2 to 1.0mm

Working area RFID Antenna



Readable Transponder-Types I-Code SLI, TAG It-HFI out of ISO15693,

# Using the HFM 3500D

## Keys for operation

key		Function
OK	ON/OFF/ACK	Switching Device On / Off, Acknowledge parameter settings
<7> yellow	pick / select	pick / select menu /function
< > black	arroys	Movement between Menu parts
C	cancel	Cancel / Back
0-9/ABC	Character / No keys	Keys for Data input, first characters
green	Pre select	Pre select code lists (* in display)

With the built in menu structure and the display you can pick and select functions and menu parts to do parameter setting or activation of functions. In the upper level after switching ON the integrated functions or the systems menu are to choose. After 1Min without any pressed key in the systems menu the devices returns to the functions menu (RUN-Mode)

## Functions

### Function SCAN Barcode

The device reads and decodes Barcodes of the released types in module 0.2 to 1mm in a distance up to 450mm after activation (Press Button) and displays the info. Depending on the setting an output via interface of the code information is possible, too. Barcodes are printed typically in ASCII and read so as well. A data output is possible in HEX-format too, with the suitable parameter. All parameter settings can be found in the sub menus inside the system area/barcode (see menu structure).

### Function SCAN RFID

The device reads transponder in distances up to 25mm after activation (Press Button) und displays the Info. Depending on the setting an output via interface of the information is possible, too. The data is always stored in hexadecimal format on the transponder. A data output is possible in ASCII-format too, but Data / Serial no. only. Error messages are shown in the display and (Parameter) possibly transmitted via interface. Up to 32 Characters data (8Blocks) can be read in one operation. All parameter settings can be found in the sub menus inside the system area/rfid (see menu structure).

### Function EDIT RFID

The device allows you to write data to transponders up to 25mm after input via key board or via telegram from Host, but always after Activation (Press Button). Parameter dependent an output via interface is possible. Messages and errors are shown in the display. The max. amount of data for writing is similar to read max. 32characters (8Blocks). The input can be (parameter!) either in ASCII or HEX-Format. All parameter settings can be found in the sub menus inside the system area/ RFID (see menu structure).

### Function SCAN Barcode and EDIT RFID

This special and unique function reads a released Barcode (3 trials) per activation (Trigger button) and writes the read information to the next Transponder into the defined memory slot (parameters). Start of Write op again with trigger button. In any case the device comes back with a message (success/ failure) onto Display / Interface. The sequence is fix, an interrupt is only possible with C. All parameter settings can be found in the sub menus inside the system area/barcode and RFID (see menu structure).

### Function SCAN ALL

This function is a combination of the functions READ Barcode and READ RFID.

The device tries after activation first to read a released transponder, 3 trials (Info on Display) and after that without a success a released Barcode. Again the info is on the display and on the interface.

After the 3 trials with out any success a error message (NoRead) is shown on Display / interface.

After a successful read (Transponder or Barcode) the operation is finished and can be started again with activation. All parameter settings can be found in the sub menus inside the system area/barcode and RFID (see menu structure)

### Further supported possibilities for interaction with the PLC system via command and interface

#### 1. Text message onto Display

With the command "MD" and directly attached ASCII-characters you can send a message with 16 characters onto the display of the device. The message has to be receipt at the device with pressing the Trigger button/OK before the device is back in work mode

#### 2. Accoustic signal

With the command „BP1“ / „BP2“ you can activate a deep /high accoustic Signal for 1s, for an easy feed back from PLC to device (User)

#### 3. Function pre select

All provided functions of the device can be pre selected from the PLC with the command „FC“ (with Acknowledgement from user) and FCx (directly without action from user) , e.g. to proceed application dependend process steps. Command FC1(x) selects function“SCAN Barcode“, FC2(x) function „SCAN Barcode-EDIT RFID“; FC3(x) the function“SCAN RFID“, FC4(x) function“EDIT RFID“ and FC5(x) the function“SCAN All“. The selection is shown on the display and is activated when used “FC” with the Trigger button. The change of any function is shown via display ( Messages ON) via “FC-ok”.

#### 4. Pre defined Data for writing onto Transponders

With the command “W” you can send Data for Writing onto any transponder via interface to the HFM, reasonable in combination with the function selection FC4(x). Pressing the Trigger button activates the Write operation directly. The command structure of the W- command is very similar to the fix mounted RFID-devices out of the RFM-Series, (see chapter commands / telegram structure) .

#### 5. Life light

With the command “?” at any time you can check the state of the devices. The response delivers the number of the active function and state in one message (“FC1-ok”)

#### 6. Input line Quantity

For simple commissioning applications or inventory checks the device provides a single input line (4 digits). This line can be activated/ deactivated in Systems menu /More. A separator for the interface telegram can be set as well (between code info and quantity) . If activated the read code (RFID or 1D) is send out in one telegram (fix) with the quantity split by the separator.

Note: all commands and data should be put directly together in line with out any gap, just gathered by the Telegram prefix / suffix.

**Systems menu**

Run Program Start of function selection  
RFID Parameter Setting for Transponder Start block and number of blocks separate for  
READ and WRITE op. Input via keys, OK for acknowledge  
BarCode Pre select of Barcode(Symbology), with No of digits,  
Choice with Green (\* as character on Display)  
Data output Prefix/Suffix, preset **STX(02)/CRLF(0D0A)**  
Data format: Select HEX/ASCII for all functions, pre set **ASCII**  
Data output:: ON/ DATA only / OFF, pre set **ON**  
ON means complete telegram (RFID)  
Interface Baud rate and Databits can be set between 4800Bd and 115kBd ,  
pre set **9600Bd, 8N1**  
Keyboard Password via Com/Password ON/OFF  
MoreMessages: activation of different messages, select with Green (\* as character in Display)

The complete menu structure is in the chapter menu.

## Device reset / Factory default

With selecting the menu point Reset device in the System menu the device can be reset to factory default..

**Note: All individual settings are lost then!!!**

## Parameter Setting

All parameters are available and can be set via key board in different sub menus within the system menu. No separate or special software tool is needed.

## Telegram- / command structure

The factory preset is similar to other RFID- devices from Leuze electronic.

The Standard telegram structure with 9600Bd, 8Databits , N,1 is:

STX	Command	CR LF
02h	ASCII-character	0Dh 0Ah

With this device type the protocol frame / data frame[STX..CRLF] and Baudrate is settable.

With the following commands (within the data frame) it is possible to have communication to the device via the interface and with activated messages=on the response is there too.:

? State request, shows operability ( S) followed by the activated function  
(e.g. FC1-ok)

FC(1-5) functions select via interface and response (FC3-OK), activation by user needed  
(device ready after key pressed) e.g. scan Barcode FC1

FC(1-5)x functions select via interface and response (FC3x-OK) without activation from user  
(device ready after beep) , e. g. scan RFID FC3x

BP(1/2) activates buzzer for 1s with high/low beep as signal

MDTEXT Textinfo an the device display for feed back to user (16characters)

**W05001xxxxxxx Data string for writing** onto Transponder, Blockwise, note parameter set

with 05 = start Block no,

00 = Tag Type universal (Tag Type prefix, adjustment like Fixreader possible)

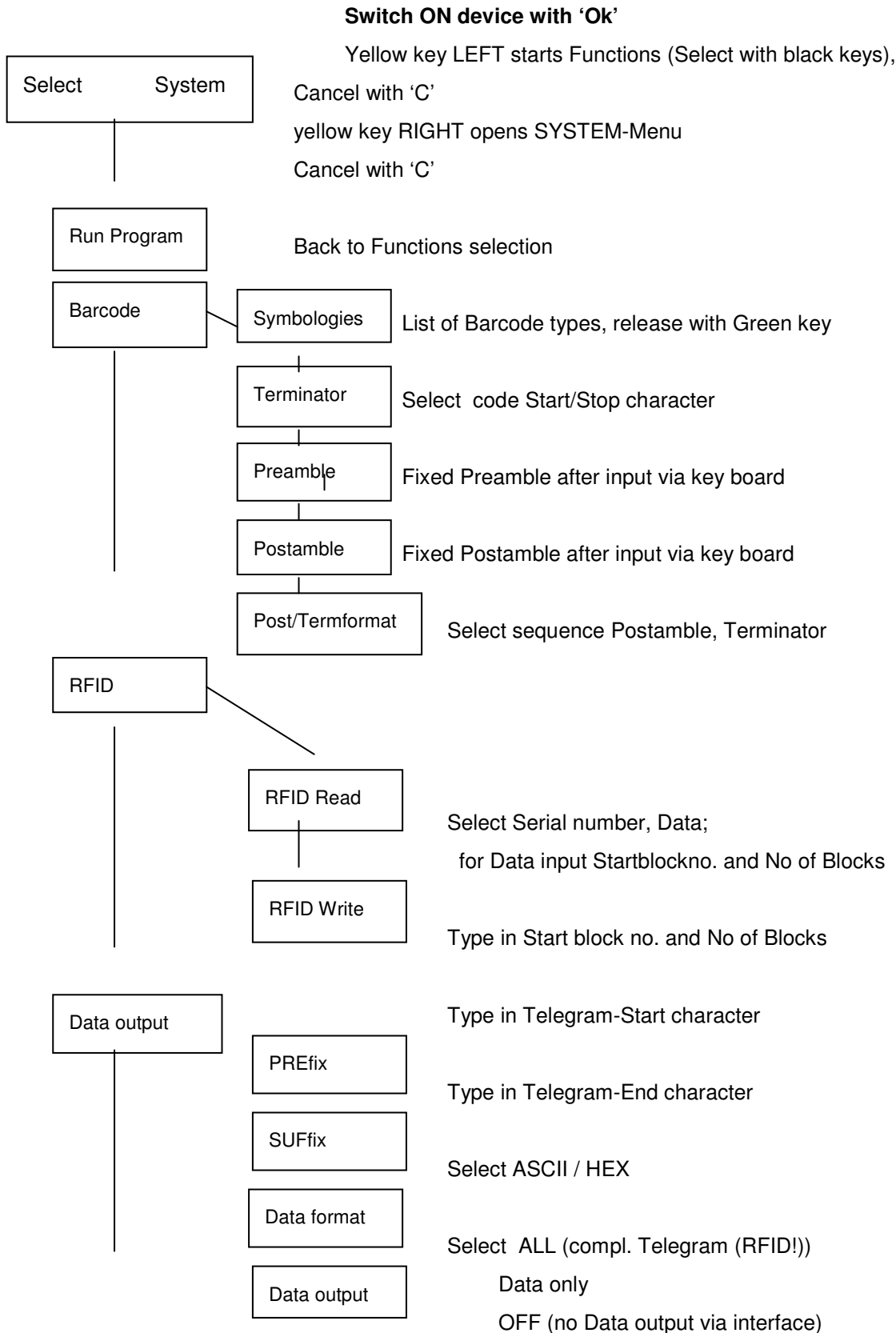
1 = No of Blocks to write (1-9 )

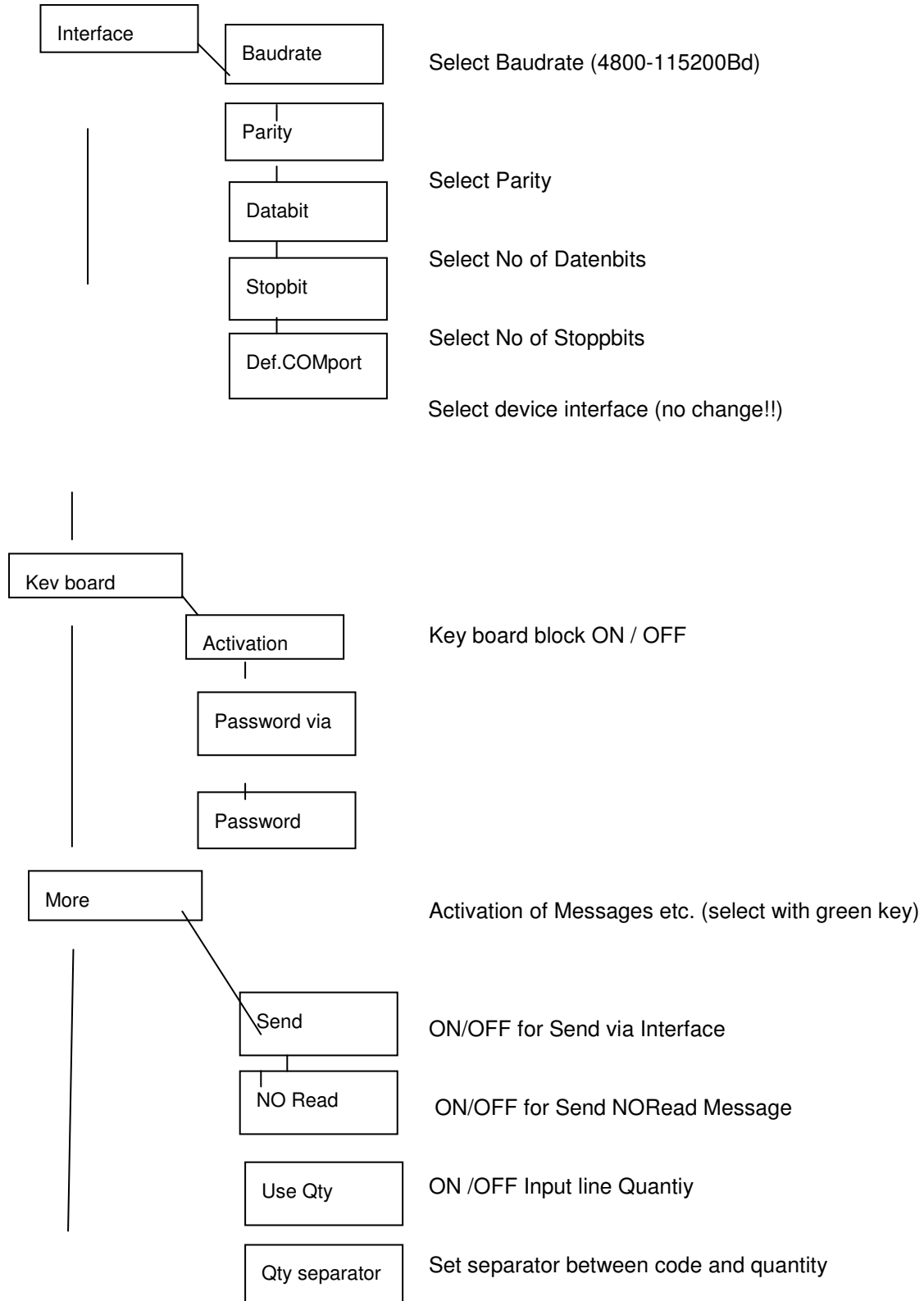
(xxxxxxx = Data (complete Block) in ASCII or HEX (parameter settable)

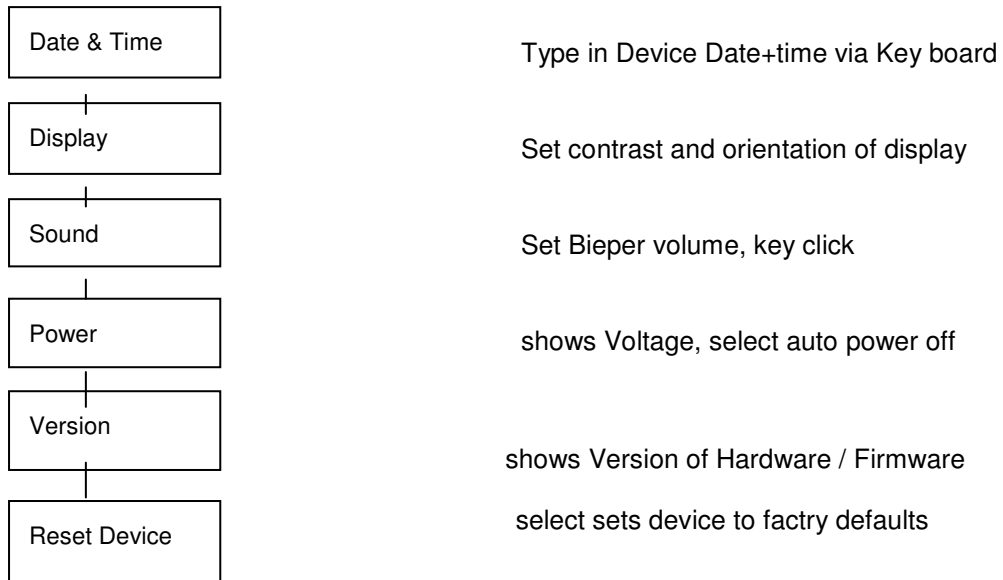
Writing is only possible with complete blocks, means 8 character(hex) at 4 Byte/Block. The Response for a W-command and trigger is 'Q5' on the interface and the message "writing successful on the display

Depending on the parameter the start block varies(systems menu).

## Menu structure









## HFM 3500D at the serial PC-Interface

With power supply via PIN 9 via RS232-cable

necessary parts:

1x 50110552 HFM3500D, incl. RS232-cable

**Pinning of the 9 Pol- D-Sub (female)**

PIN-No	Signal	Description
2	TX	Transmit Data (-5 to +5V)
3	RX	Receive Data (-5 to +5V)
5	GND	Signal Ground
9	Signal	4,5 - 6 VDC, external Via Connector or direct

with Power supply via separate power plug NT Hx5x0,

Art-Nr. 501 10676

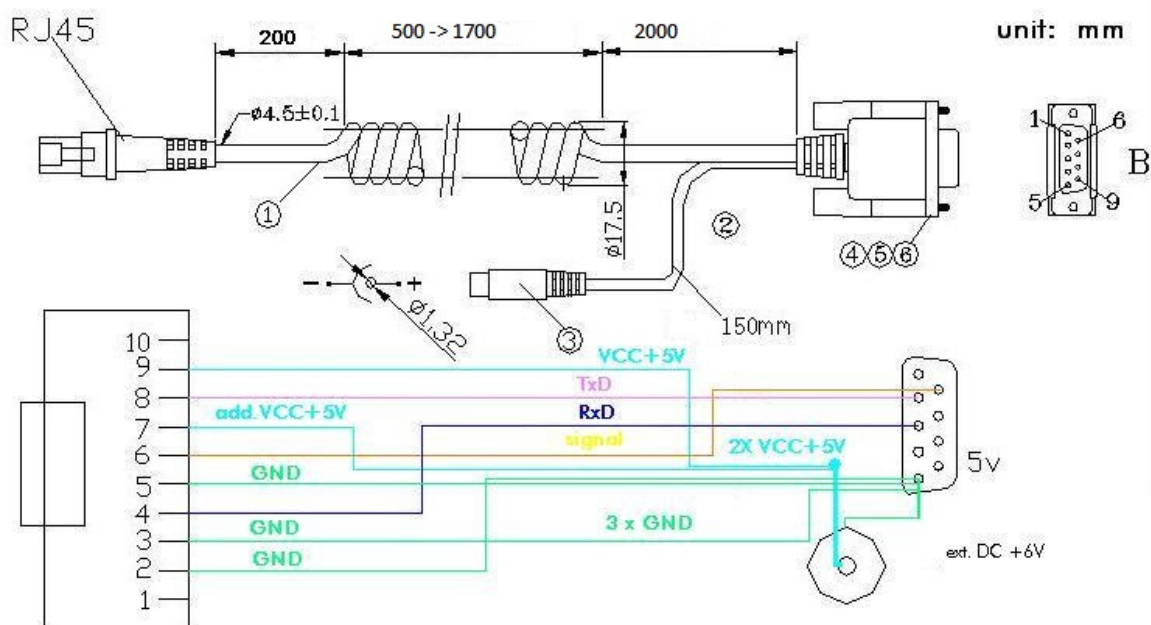
necessary parts:

1x 50110552 HFM 3500D, incl. RS232-cable

1x 50110676 NT Hx5x0, Power supply(100-240VAC/6VDC)

**Pinning of the 9 Pol- D-Sub (female)**

PIN-No	Signal	Description
2	TX	Transmit Data (-5 to +5V)
3	RX	Receive Data (-5 to +5V)
5	GND	Signal Ground
9	Signal	4,5 - 6 VDC, external Via Connector or direct



## HFM 3500D with MA 2xxi (e.g. MA204i, MA208i or MA248i)

RS 232 with 9600 Baud, 8 Databits, 1 Stoppbit, No Parity, Postfixes CR/LF.

Necessary parts:

1x	50110552	HFM 3500D, incl. RS232-cable
1x	50113397	KB JST-HS-300, 5VDC at PIN9
1x	50112891	MA 248i for Profinet RT I/O, (for Ethernet: 50112892 MA 208i or Profibus: 50112893 MA 204i)

Please connect the HFM to the 9-PIN Sub-D.

## HFM 3500D with MA 21 (multinet)

Separate power supply needed.

**Note:** The RS 232 of the MA21 is set to 9600 Baud, 7 Databits, 1 Stoppbit, Parity Even, Postfixes CR/LF. Please change at HFM for proper functionality

Necessary parts:

1x	50110552	HFM 3500D, incl. RS232-cable
1x	50035421	KB 021 Z
1x	50030481	MA 21 100

### Pinning KB021 Z

Colour:	Signal	Clamp in MA 21:
Brown	(RXD)	26
White	(TXD)	27
Blue	(GND)	28
Red	(VCC)	30
Black	(GND)	31
blank (Shield)	(PE)	21

## HFM 3500D with USB (COM-Port-Emulation)

To use the HFM 35xxD with USB you use the standard RS232 cable from the Base Hx520 and connect the USB Converter cable. The Data is sent to the new COM-Port. The necessary driver is available on [www.leuze.de](http://www.leuze.de). the interface is set to 9600,8,N,1. Separate power supply needed.

Necessary parts:

- 1x 50110552 HFM 3500D, incl. RS232 -cable
- 1x 50110676 NT Hx5x0, Power supply(100-240VAC/6VDC)
- 1x 50110677 KB-USB-RS232, converter cable, 1m

**USB-converter cable KB-RS232-USB, Length 1m Art-No. 50110677**

Pinning of the USB-connector, 9 pin Sub-d like above

Note: Operation with external power supply recommended

USB-Type A-Plug	Signal	Description
1	VCC IN	5 VDC
2	Data -	Data -
3	Data -	Data +
4	GND	Signal Ground

## Triggering /Activation


For starting the SCAN operation / activation signal (trigger) you use the Trigger button at the handle of the device.

## Diagnostics and trouble shooting



Typical errors and their possible causes are described in the following list as well as tips for their elimination:

1. Is the device connected to a suitable power supply from the PC– means device and PC/PLC should be connected to each other before switch ON. The external power supply should have 6VDC/1A
2. If you use the separate Power plug please check the connections
3. Make shure the interface cable is fixed correctly at the PC/PLC. Details for the interface are printed usually in the manual of the PLC/PC.
4. If you checked all steps before and the device is still not ready, change the power supply to another one.
5. Please check the used interface at the device and your PC/PLC are compatible. Information about that are printed in the PC´s /PLC´s manual.
6. Barcode: Please check the quality of the Barcode Labels, and the correct symbologies are released. Damaged labels (scratched, dirty or crinkled) can cause hardly readable or not readable codes.
7. RFID: Please check the settings for RFID and check the transponder type with your supplier. If the settings are correct the transponder can be defect as well- try another one if possible.
8. Now you checked most possibilities. For further support please contact the Leuze Service.

## Type overview

HFM 35xx – Series			
Art-No.	Description	Interface	Picture
50110552	HFM 3500D, incl. cable	TTL RS232	

## Accessories

Accessories for HFM 35xx -Series					
Art-No.	Description		Picture		
50103403	NT Hx5x0, external Power supply for HFM/HFU, Base Hx520 for RS 232 cable (100-240VAC/ 6 Volt DC)				
50110677	USB-converter cable for HFM/HFU or Base Hx520				

## Connection to Leuze multinet Plus

- MA 21100 Gateway / Multinet Slave  
Art-No. 50030481
- KB 021 Z Connector cable MA 21 to 9pin Sub-D  
Art-Nr. 50035421



## Connection to Profibus

- MA 204i Profibus-Gateway with 5 VDC power supply for hand helds  
Art-Nr. 50112893
- KB JST-HS-300 connection cable MA 2xxi and 9 pin Sub-D, 5Volt via PIN9, 300mm long  
Art-Nr. 50113397

## Connection to ProfiNet RT I/O

- MA 248i ProfiNet-Gateway with 5 VDC power supply for hand helds  
Art-Nr. 50112891
- KB JST-HS-300 connection cable MA 2xxi and 9 pin Sub-D, 5Volt via PIN9, 300mm long  
Art-Nr. 50113397

## Connection to Ethernet TCP/IP

- MA 208i Ethernet-Gateway with 5 VDC power supply for hand helds  
Art-Nr. 50112892
- KB JST-HS-300 connection cable MA 2xxi and 9 pin Sub-D, 5Volt via PIN9, 300mm long  
Art-Nr. 50113397

### Leuze **electronic** GmbH+Co.KG

Postfach 1111

In der Braike 1

D-73277 Owen / Teck

Tel +49 (07021) 573-0

Fax +49 (07021) 573199

E-mail: [info@leuze.de](mailto:info@leuze.de)

<http://www.leuze.de>

State 02/2012

Document TD\_HFM3500D\_en\_50229338