Leuze electronic

the sensor people

HFM 3520D
combined mobile RFID- and Barcode- reader with Bluetooth

Short Description

Version V 2.0

Note

This document is just for Information about how to use the mobile combi device HFM 3520D 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 document, too.

Content

Delivery contents

HFM 3520D

1. combi RFID + Barcode-Hand held reader
2. pre mounted Battery 3.7V / 1500mAh
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 athmosphere*
- *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 the safety standards EN60825 for a class 2 product.
The HFM 35x0D 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 battery is fixed inside the device. To charge the battery and to transmit data the **Base Hx520, a power supply NT Hx5x0 and a cable from the base to a PLC(RS232) is neccessary**! **All these accessories are to order separately!**

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 from the base 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 RS232-cable.
2. The base must have a separate Power supply (NT Hx5x0, 50110676).Plug in the power supply into a power socket 110-240VAC.
3. Before switching „ON“ the device we recommend some hours of charging the battery (within the handle) with the device putting onto the Base. The charging process is shown with the RED LED (above the right edge of display)
4. To switch „ON“ the device please press the ‚OK‘ key. The GREEN LED (above left edge of the display) shows the ON state as well.
5. The device tries now to set up a Bluetooth connection to a base. The BLUE LED (above the right edge of display) shows the Bluetooth.
6. As soon the connection works, the display shows the functions selection and the device is ready to use.
7. 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‘ menu (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:

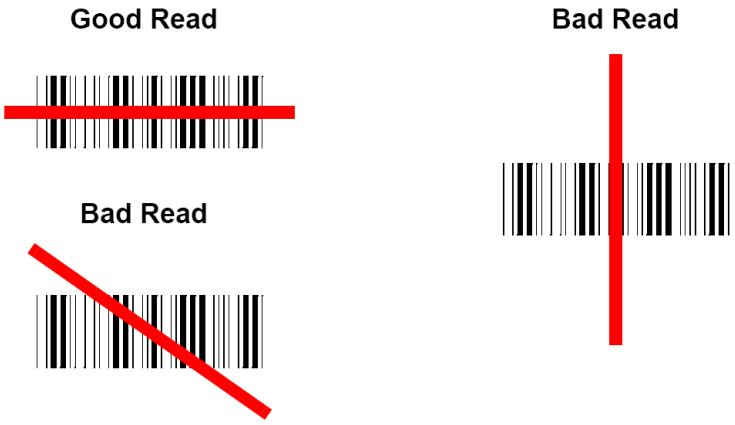
The Scanner should be held with alight angle to the code. (Don´t used it in 90° to the Code, because you get total reflexion and read failure.)

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 be cover over 70%.of the tag to have good conditions for reading it. The reading areas are printed further on

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	battery, 3.7VDC, 1500mAh

Interface

Interface type	Bluetooth V1.2, 10m Via Base RS232, 9pin Sub-D
Emulation	USB-COM-Port with converter cable

Code and Transponder types

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

Mechanical Data

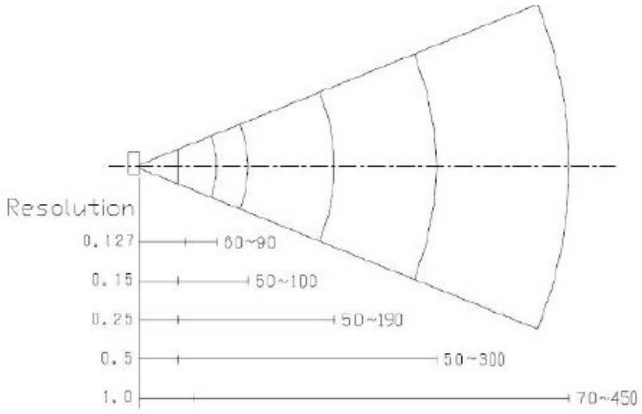
Display	OLED (128x64)
Key board	19 keys
Weight	172 g (without cable)
Dimensions	135 x 104 x 145 mm
Material	ABS, silver grey

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

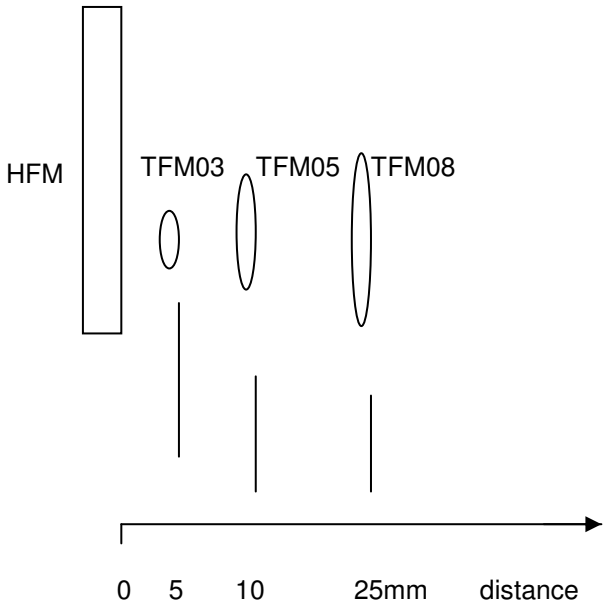
Read Characteristics

Working area Laser



Readable Barcode-Types (Release per selection, * 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
Module: recommended 0.2 to 1.0mm

Working area RFID Antenna



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

Using the HFM 3520D

Keys for operation

key		Function
OK	ON/OFF/ ACK	Switching Device On / Off, Acknowledge parameter settings (return)
<7> yellow	pick / select	pick / select menu / function
< > black	arrows	Movement between Menu parts
C	cancel	Cancel / Back
0-9 /ABC	number / character keys	Keys for Data input First characters, then number
green	Pre select	Switch between numbers-characters

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 functions or the systems menu are to choose.

Functions

Function SCAN Barcode
The device reads and decodes Barcodes of the released types in modul 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). The configuration can be done alternatively with the pre defined Barcodes (see configuration).

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 of 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. 32Byte (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 SCAN Barcode and SCAN RFID.
The device tries after activation first to read a 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 an error message (NoRead) is shown on Display / interface and a Beep.
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, only if device is NOT in the systems menu

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. **Accustic signal**
   With the command „BP1“ / „BP2“ you can activate a deep /high accoustic signal for 1s, for an easy feed back from PLC to the device

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 sign**
   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), pre set value
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 setable.

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

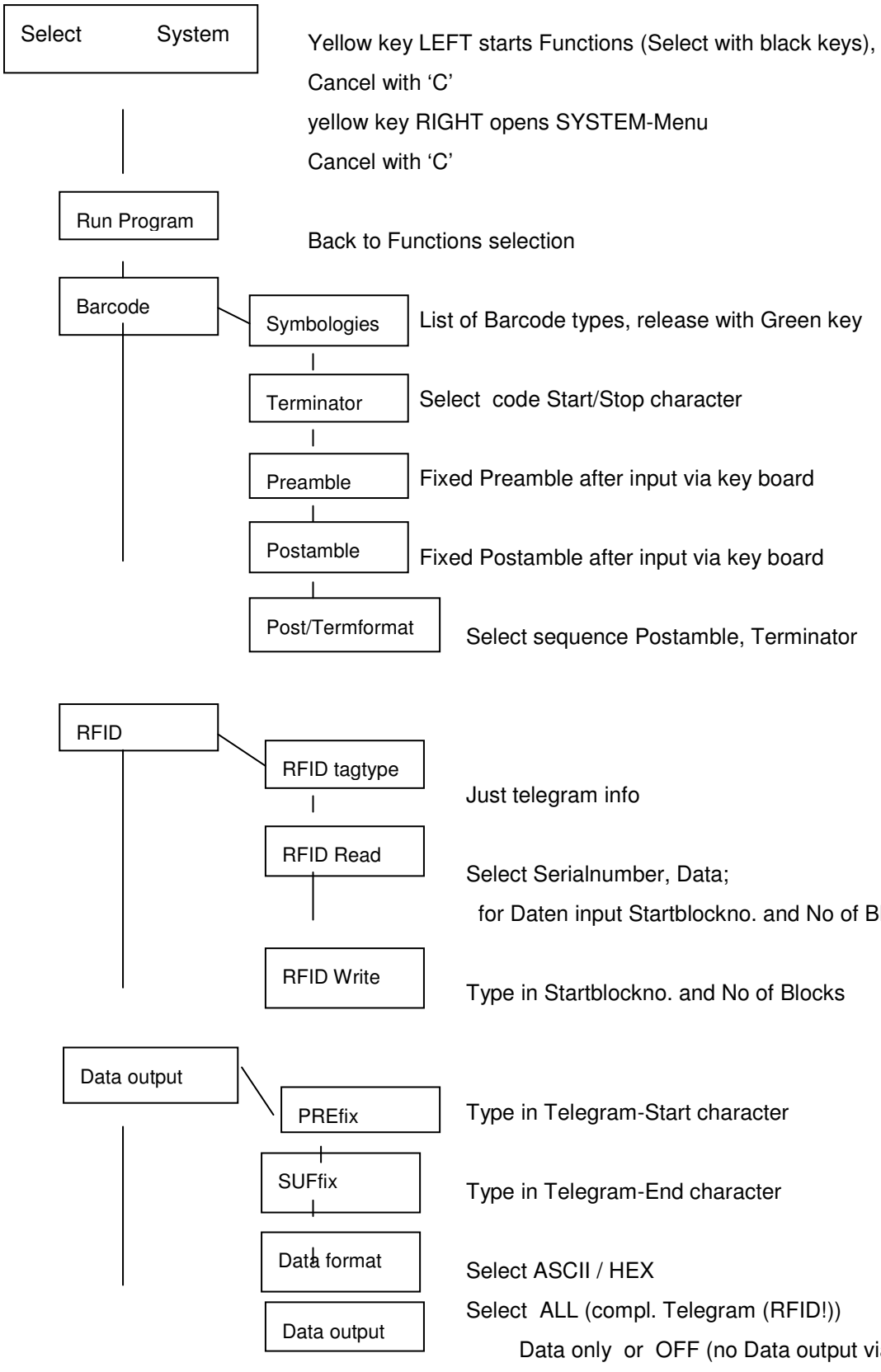
MDTEXT Textinfo an the device display for feed back to user (16characters)

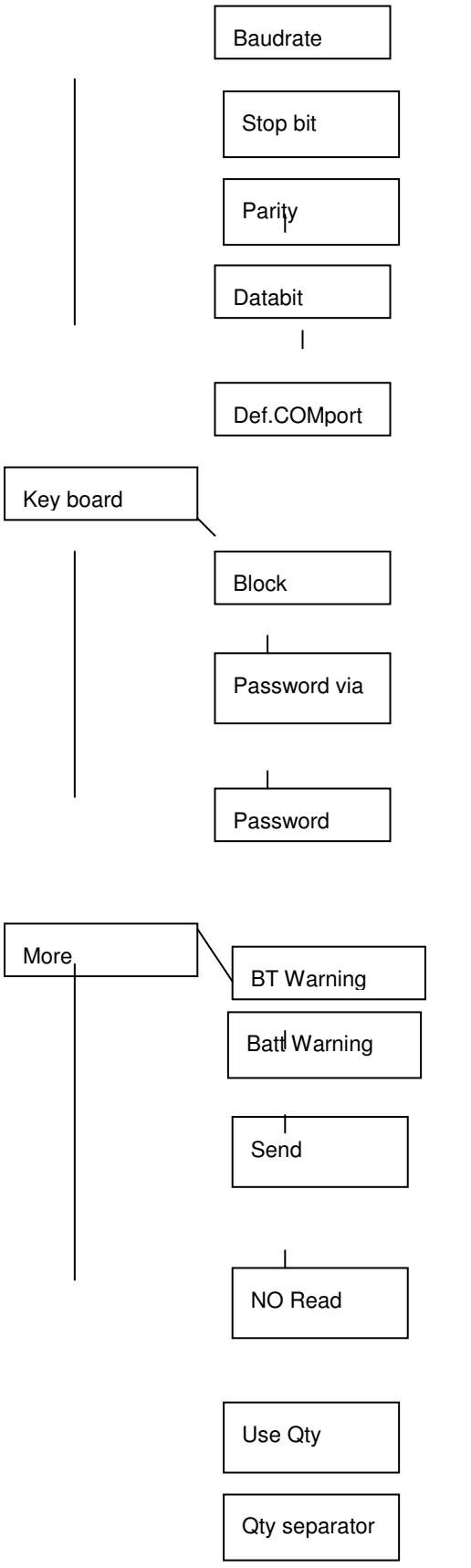
W05001xxxxxxxx Data string for writing onto Transponder, Blockwise, note parameter set
with 05 = start Block no,
00 = Tag Type universal (Tag Type prefix, adjustment like Fixreader possible)
1 = No of Blocks to write (1-9)
(xxxxxxxx = Data (complete Block) in ASCII or HEX (parameter setable)
Writeing 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

Switch ON device with ‘Ok’





Select Baudrate (4800-115200)

Select Parity

Select No of Datenbits

Select No of Stoppbits

Select device interface (no change!!)

Key board block ON / OFF

Activation of Messages (select with green key)

ON/OFF for Bluetooth message*

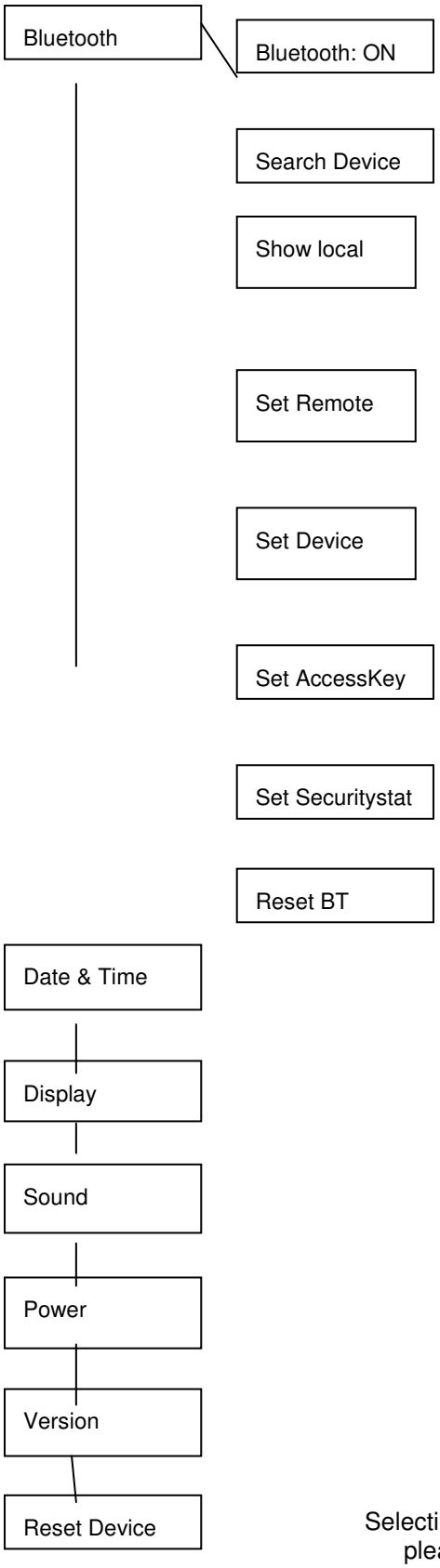
ON/OFF for Battery warning*

ON/OFF for Send via Interface

ON/OFF for Send NORead Message

ON /OFF Input line Quantiy

Set separator between code and quantity



Settings for bluetooth, MAC adresses, Access key, and Bluetooth reset , Shows BT State, ON / OFF

Activates Search process for BT Base

Shows actual MAC address

Manual Set ting of MAC address

Manual Setting of Device Name

BT PIN: Factory 1234

Usage of BT PIN ON / OFF

Reset and start of Bluetooth connection

Type in Device Date+time via Key board

Set contrast and orientation of display

Set Bieper volume, key click

Shows Voltage (PWR), select auto power off time

Shows HW-/ FW version of device in display

Selection sets device to factory defaults, for reseting BT part please select TWICE

Note: Depending on the Firmware the device expects the telegram twice within 2sec. the Error E22 shows that reqeust.The Bluetooth connection can be disturbed by lots of large items in the line of sight to the Base.

HFM 3520D at serial PC-Interface

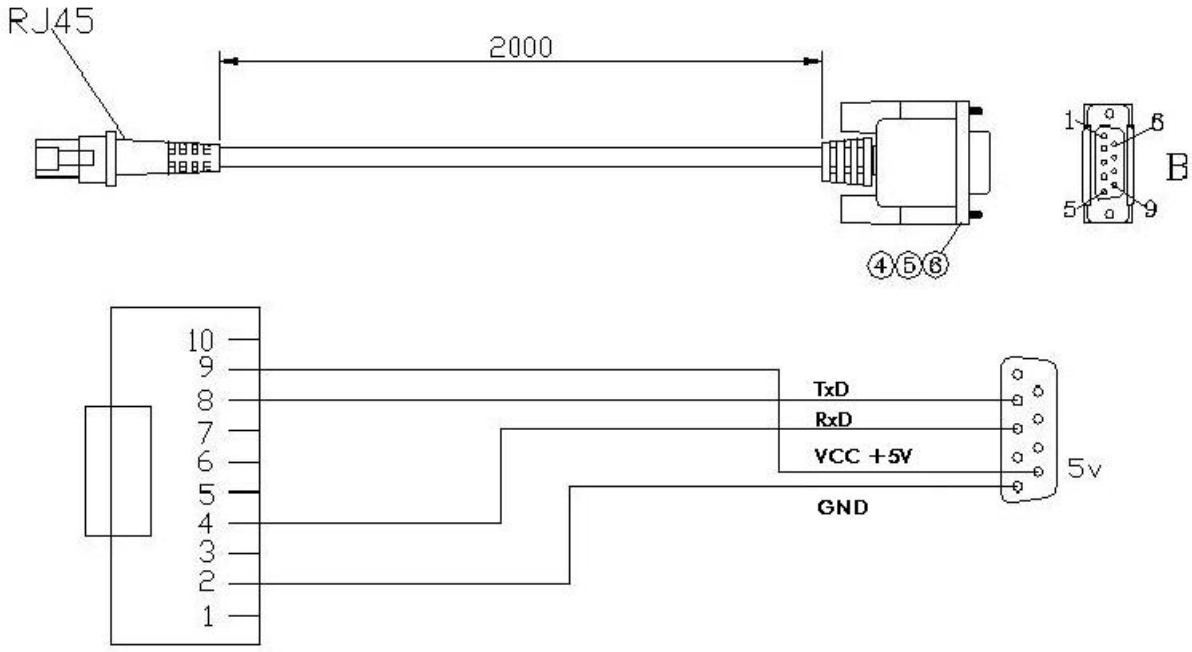
With connected base and separate power supply

necessary parts:

1x	50110551	HFM3520D, incl. battery
1x	50110676	NT Hx5x0, Power supply (100-240VAC/6 VDC)
1x	50110672	Base Hx520, Bluetooth base
1x	50110675	KB-RS232-Base Hx520, RS232 cable, 2m

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

PIN-No	Signal	Description
2	TX	Transmit Data (-5 to +5V)
3	RX	Receive Data (-5 tos +5V)
5	GND	Signal Ground
9	Signal	4,5 - 12 VDC, external Via Connector or direct



HFM 3500D with MA 204i, MA208i or MA248i

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

Necessary parts:

1x	50110551	HFM 3520D, incl. battery
1x	50110676	NT Hx5x0, Power supply (100-240VAC/6 VDC)
1x	50110672	Base Hx520, Bluetooth base
1x	50110675	KB-RS232-Base Hx520, RS232 cable, 2m
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-pol Sub-D.

HFM 3520D with MA 21 (multinet)

Connection from MA21 clamps with cable KB 021 Z to cable from Base KB-RS232-Base HX520, RS 232 with 9600 Baud, 7 Databits, 1 Stoppbit, Parity Even, Postfixes CR/LF. Separate power supply needed. Neccessary parts:

1x	50110551	HFM 3520D, incl. battery
1x	50110676	NT Hx5x0, Power supply (100-240VAC/6 VDC)
1x	50110672	Base Hx520, Bluetooth base
1x	50110675	KB-RS232-Base Hx520, RS232 cable, 2m
1x	50035421	KB 021 Z
1x	50030481	MA 21100

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

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

Please connect the cable from the Base to the 9-pol Sub-D.

HFM 3520D with USB (COM-Port-Emulation)

To use the HFM3520D with USB you use the standard RS232 cable from the Base Hx520 and connect the USB Converter cable. The Data is sended to the new COM-Port. The neccessary driver is available on www.leuze.de. the interface is set to 9600,8,N,1. Separate power supply needed. Neccessary parts:

1x 50110551 HFM 3520D, incl. battery

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

1x 50110672 Base Hx520, Bluetooth base

1x 50110675 KB-RS232-Base Hx520, RS232 cable, 2m

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

For starting the SCAN operation / activation signal (trigger) please press the trigger button at the handle of the device. An external activation is not possible.

Diagnostics and trouble shooting

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

1. The Base must be connected to the external power supply NT Hx5x0 (charging) and the battery of the device should be fully charged. If the battery is NOT fully charged the RED LED (above right edge of display) is ON, when device place in onto the Base.
2. 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.
3. If you checked all steps before and the device is still not ready, change the power supply to another one (6VDC/1A), you know is working.
4. Please check the used interface at the Base and your PC/PLC are compatible. Information about that are printed in the PC´s /PLC´s manual.
5. Bluetooth: If you just receive data on the display but not on the PC/PLC please check the BLUE LED. If necessary either type in the address of the Base in Systems menu /Bluetooth or just start the connection process for the Bluetooth interface. A second cause could be in the settings of the Data output in the Systems menu. Please check the Data output is set to FULL or on DATA ONLY.
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 an other 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
50110551	HFM 3520D, incl. battery	Bluetooth	

Accessories

Accessories for HFM 35xx					
Art-No.	Discription		Picture		
50110672	Base Hx520, Bluetooth base and charging station for HFU/HFM, RS232				
50110675	KB-RS232-Base Hx520, RS232-cable for Base, 2m length				
50110676	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, Base Hx520				
50111928	Battery Hx520, Spare part, 3.7VDC, 1500mAh				

Connection to Leuze multinet Plus

- MA 21100 Gateway / Multinet Slave
  Art-No. 50030481
- KB 021 Z Connection cable MA 21 to 9pol Sub-D
  Art-No. 50035421
- Base Hx520 Bluetooth Base
  Art-No. 50110672
- NT Hx5x0 Power supply, (100-240VAC/6 VDC)
  Art-No. 50110676
- KB-RS232-Base Hx520 RS232-cable for Base, 2m length
  Art. No. 50110675

Connection to Profibus

- MA 204i Profibus-Gateway with 5 VDC power supply for hand helds
  Art-Nr. 50112893
- KB JST-HS-300 connnection cable MA 2xxi and 9 pin Sub-D, 5Volt via PIN9, 300mm long
  Art-Nr. 50113397
- Base Hx520 Bluetooth Base
  Art-No. 50110672
- NT Hx5x0 Power supply, (100-240VAC/6 VDC)
  Art-No. 50110676
- KB-RS232-Base Hx520 RS232-cable for Base, 2m length
  Art. No. 50110675

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 connnection cable MA 2xxi and 9 pin Sub-D, 5Volt via PIN9, 300mm long
  Art-Nr. 50113397
- Base Hx520 Bluetooth Base
  Art-No. 50110672
- NT Hx5x0 Power supply, (100-240VAC/6 VDC)
  Art-No. 50110676

- KB-RS232-Base Hx520 RS232-cable for Base, 2m length
  Art. No. 50110675

Connection to Ethernet TCP/IP

- MA 208i Ethernet-Gateway with 5 VDC power supply for hand helds
  Art-No. 50112892
- KB JST-HS-300 connnection cable MA 2xxi and 9 pin Sub-D, 5Volt via PIN9, 300mm long
  Art-No. 50113397
- Base Hx520 Bluetooth Base
  Art-No. 50110672
- NT Hx5x0 Power supply, (100-240VAC/6 VDC)
  Art-No. 50110676
- KB-RS232-Base Hx520 RS232-cable for Base, 2m length
  Art. No. 50110675

Leuze electronic GmbH+Co.KG
Postbox 1111 / In der Braike 1
D-73277 Owen / Teck
Tel +49 (07021) 573-0
Fax +49 (07021) 573199
E-mail: info@leuze.de
http://www.leuze.de

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