Leuze electronic

the sensor people

HFU 4500D
combined mobile RFID- and 1D / 2D Code- hand held reader with cable

Short Description

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Version V 2.01

Note

This document is just for information about how to use the mobile combi device HFU 4500D 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 connector units (MA) are in this manual, too.

Content

Delivery contents

HFU 4500D

1. Mobile combi RFID + 1D/ 2D code-Hand held reader
2. RS232 spiral cable, 4m length
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 HFU 45x0D series are conceived as mobile devices With integrated decoder for manual object identification with typical barcodes and UHF transponders.
In particular unauthorized uses include:

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

Areas of application

The combined mobile devices HFU 45x0D are designed for the following areas of application:

- Storage and conveying technologies for manual object identification
- Manual commisioning 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.

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.
3. Plug in the power supply into a power socket 110-240VAC (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.

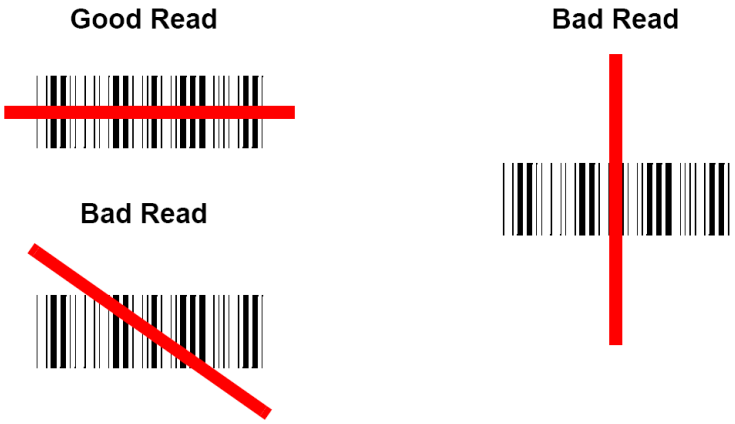
The red LED-Line is smaller and narrow if the device is close to the code. Codes with small and thin bars should be read with a smaller distance, for larger codes the distance should be bid enough to have the

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.

The read characteristics are printed on page 8



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		UHF (868MHz/915Mhz)
Transponder protocol		EPC1Gen2
Read-/Write range		max. 450mm*
Antenna size120x70mm		

Optical CODe reader

Opt.System	Imager, int. LED	
Code types	1D / 2D Codes	
Range	1D	max. 350mm**
	2D	max. 150mm**
Module	0.2 to 1mm	
Cell size	0.2 to 0.9mm	

Power Supply	4.5 - 6VDC,ext. power

Code and Transponder types

2D Codes	ECC200, QR, PDF417,ECC200 GS1-Databar-family
1D Codes	Code 39 /128, Code 93 , 2/5 Interleaved ,EAN 8/13,UPC
readable Transponders	EPC1Gen2 (NXP G2XM/,G2XL, Alien Higgs)

Interface

Interface type	RS232, 9pol Sub-D
Emulation	USB-COM-Port with Converter cable

Mechanical Data

Display	OLED (128x64)
Key board	19 keys
Weight	380 g (without cable)
Dimensions	135 x 104 x 145 mm
Material	ABS, silver grey

Environmental Data

Valid Standards	EN 301489-3 EN 302208-1
Protection class	IP54
Temperature (operation)	-20 to 50 °C
(storage)	-20 to 50 ° C

* depends on used Transponder
**depends on used optical 1D / 2D code type

Read Characteristics

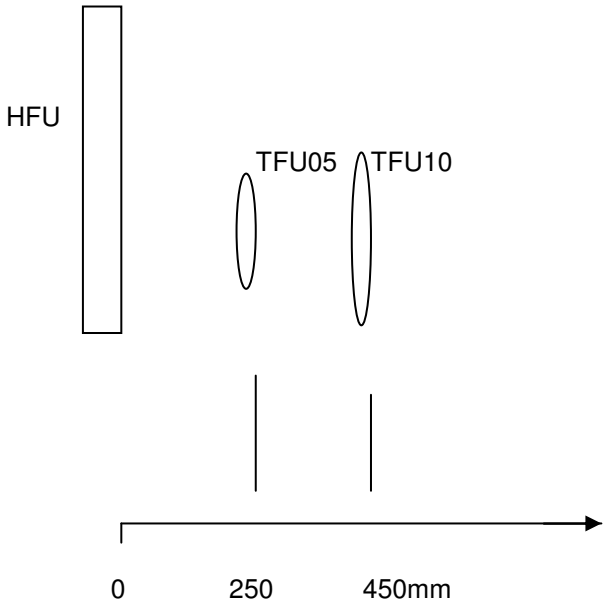
Working area imager 1D / 2D

Resolution	1D	2D
0.15	30-70mm	-
0.25	30-150mm	10-50mm
0.5	30-250mm	10-100mm
1.0	50-350mm	20-150mm

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
Module: recommended 0.2 to 1.0mm

Readable 2D-Codes: (Release per selecting, factory set all)
ECC200, PDF, QR, Maxicode, GS1-codabar Familiy
Cell size: 0.21 to 0.9mm,

Working area RFID Antenna



Readable Transponder-Types: EPC1Gen2 (NXP G2XM, GSXL, Alien Higgs3
Out of ISO18000-6C)

Using the HFU 4500D

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	arrows	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 functions or the systems menu are to choose. The device returns automatically after 1min (starting with last pressed key) from the Systems menu back to the function select (RUN-Mode).

Functions

Function SCAN Barcode
The device reads and decodes 1D / 2D Codes of the released types in a distance up to 350mm after activation (Press Button) and displays the info. Depending on the setting an output via interface of the code information is possible, too. 1D / 2D codes 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 codes (see configuration).

Function SCAN RFID
The device reads transponder in distances up to 450mm 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 32Bytes (depends on tag!) 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 400mm 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), depends on tag. 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 /2D (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 fixed, 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 without any success an 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 acoustic signal for 1s, for an easy feed back from PLC to device

3. **Function pre select**
   All provided functions of the device can be pre selected from the PLC with the command „FC"(with acknowledge from user) or "FCx"(without any action from user) , e.g. to proceed application dependent process steps.
   The 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 when using "FC" activated with the Trigger button.

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 HFU, 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 the same as known from the fix mounted RFID-devices.

5. **Ready signal / alive sign**
   With the command "?" a ready signal and the state of the device can be detected. The device comes back (activate Messages) with "SFC0" when no function is selected, "SFC1" with selected function 1 (SCAN Barcode) etc. (see no 3.)

Note: Please combine Commands and Data (characters or numbers) directly (without space between) into One single telegram, enclosed of 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:: Full/ DATA only / OFF, pre set **Full**
full 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)
Device Settings Pre setting Region (UHF-Band) and power level

The complete menu structure is in the chapter menu.

Device reset / Factory default

With selecting the menu point “Reset device” in the Systems 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 presets are similar to the other available fix mounted RFID- devices from Leuze electronic. The Standard telegram structure is shown below, with 9600Bd, 8 Databits , N,1 :

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

For this device you can change the telegram frame and the Baudrate.

With the following commands via the serial interface (within the upper shown frame) the functions selection or other operations can be set and with activated messages (systems menu) you receive responses:

? State check, gives back a Ready sign (S) followed by the selected function (e.g. SFC1)

FC(1-5) Function change with response (FC3-OK), function active through User (Triggerbutton) (device ready for use after pressing trigger!)

FC(1-5)x Function change with response (FC2x-OK) directly without activation through user (device ready at once after response)

BP(1/2) Activation of device beeper with high / low Beep

MDTEXT Text on display for process control

W0100020002000000xxxxxxxx Datapreset for writing onto Transponder, block wise, look on settings

With 01 = Bank for Access (Writing)

0002 = Block starting with for Writing,

0002 = No of bytes to write (2-20 possible)

000000 = Tag Type universal (Tag Type prefix, adjustable)

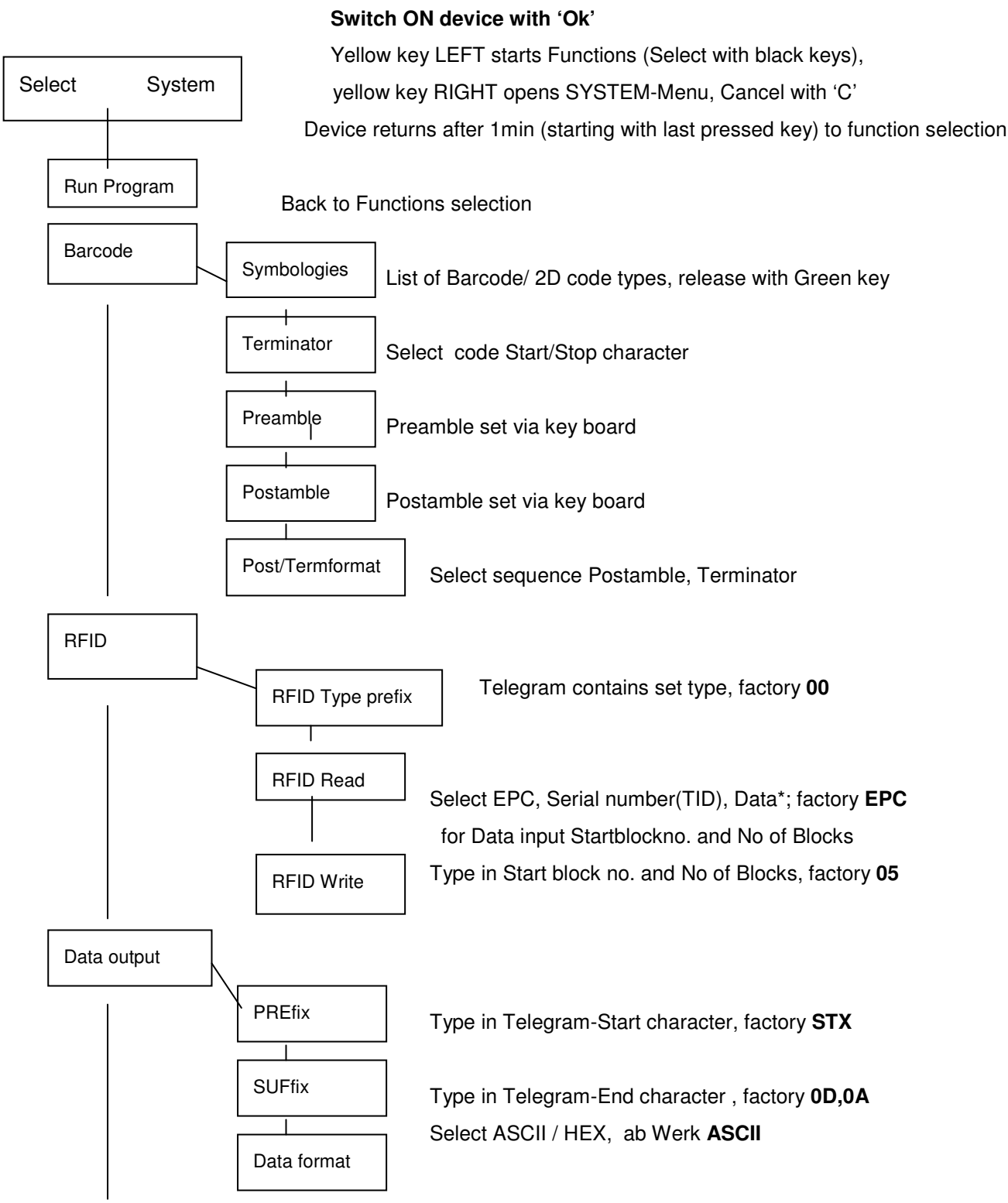
(xxxxxxxx = Data (complete Block)

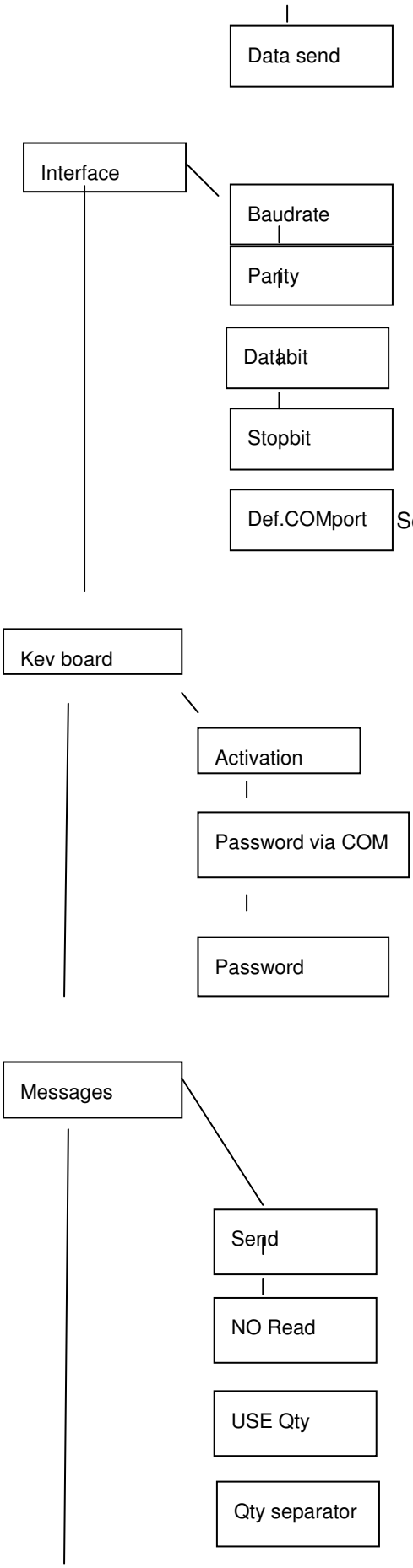
For writing always a complete Block is 4 characters (hex) at 2 Byte/Block. The response on W-command after a trigger is 'Q5' on the interface and Message on Display “Write successful“

Depending on setting the writing is done in EPC-area (bank 01) or User area (bank03) .

For reading / writing of memory banks on the Transponder always the byte counting start on 00 and is transmitted in the telegram (Full).

Menu structure





Select FULL (compl. Telegram (RFID!)), factory **full**
Data only
OFF (no Data output via interface)

Select Baudrate (4800-115200), factory **9600**

Select Parity (None, Even, Odd), factory **None**

Select No of Datenbits (7,8), factory **8**

Select No of Stoppbits(1,2); factory **1**

Select device interface (no change!!), COM1

Key board protection ON / OFF , factory **OFF**

Type password via keyboard

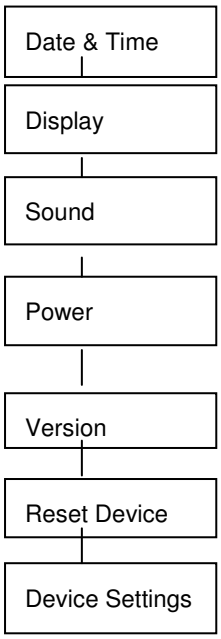
Activation of Messages (select with green key)

ON/OFF for Send Messages via Interface, factory **OFF**

ON/OFF for Send NORead Message, factory OFF

ON/OFF for Inputline to type in Quantity, factory OFF

Choose separator sign for Quantity in output telegram



Set Device Date+time via Keyboard

Set contrast and orientation of display

Set Bieper volume, key click

shows supply Voltage, select auto power off time

shows Version of Hardware / Firmware of device

select sets device to factry defaults

select Region (UHF-Band), power level
Region EUROPE, USA,Korea, China; factory **EUROPE**
Gen2 Session:(filtering time of recognized tags)
(0-no filter, 1-5sec, 2-10sec, 3-15sec), factory **1**
power: 10mW to 200mW(value 1000-2300), factory **2300**
recommended min 1700 (with reset this point is first)

* Note: The availability of the memory banks TID (serial number), EPC and User block depends on the used transponder chip and may be not always available. The EPC bank is typically available with 8 – 12 characters and 4-6 blocks at any chip type.

HFU 4500D at serial PC-Interface

With power supply via PIN 9 via RS232-cable

neccessary parts:

1x 50113280 HFU 4500D, incl. cable 4m length

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

PIN-No	Signal	Description
2	TX	Transmit Data (-5 to +5V)
3	RX	Recieve Data (-5 tos +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. 50110676

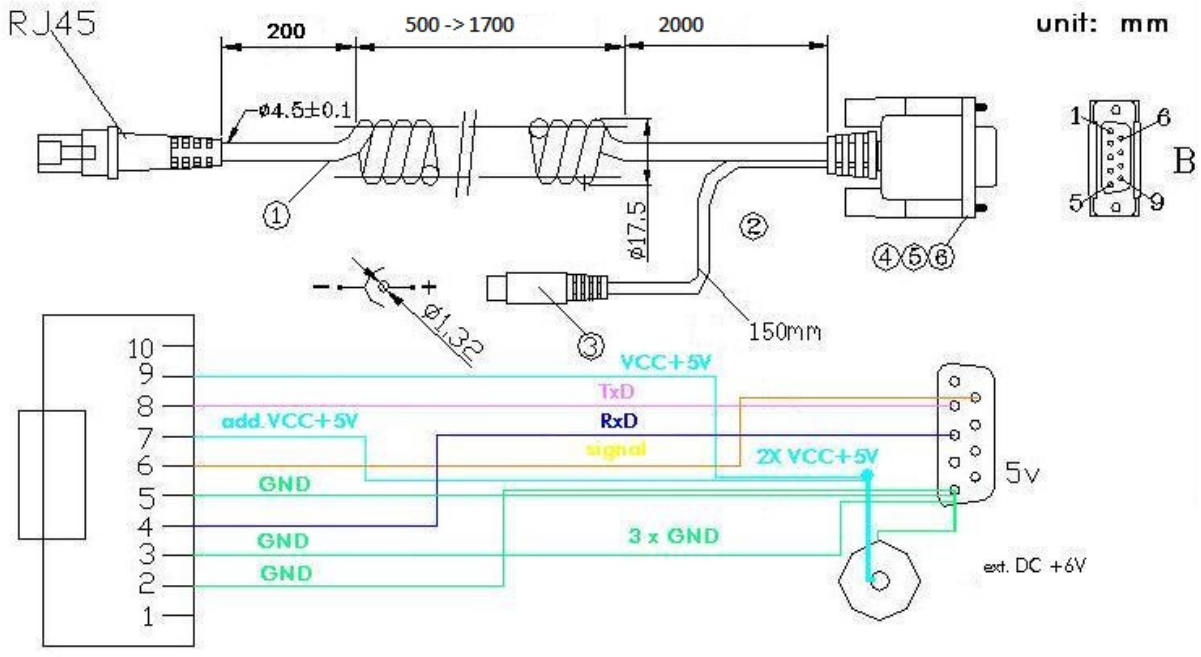
neccessary parts:

1x 50113280 HFU 4500D, incl. RS232-cable 4m length

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	Recieve Data (-5 tos +5V)
5	GND	Signal Ground
9	**Signal**	4,5 - 6 VDC, external Via Connector or direct



HFU 4500D with MA 204i, MA208i or MA248i

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

Necessary parts:

1x	50113280	HFU 4500D, incl. cable 4m length
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 HFU to the 9-pin Sub-D.

HFU 4500D with MA 21 (multinet)

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

Necessary parts:

1x	50113280	HFU 4500D, incl. cable 4m length
1x	50035421	KB 021 Z
1x	50030481	MA 21100

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

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HFU 4500D with USB (COM-Port-Emulation)

To use the HFU45xxD with USB you use the standard RS232 cable and connect the USB Converter cable. The data is sent to the new COM-Port. The necessary driver is available on www.leuze.de. the interface is set to 9600,8,N,1.Separate power supply needed.

Necessary parts:

1x 50113280 HFU4500D, incl. RS232 -cable

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

1x 50110677 KB-USB-RS232, converter cable, 1m length

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 sure 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 is printed in the PC´s /PLC´s manual.
6. 1D / 2D Code: Please check the quality of the Barcode / 2D 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

HFU 45xx – Series			
Art-No.	Description	Interface	Picture
50113280	HFU 4500D, incl. Cable 4m	TTL RS232	

Accessories

Accessories for HFU 45xx					
Art-No.	Discription		Picture		
50110676	NT Hx5x0, external Power supply for HFM/HFU, Base Hx520 (100-240VAC/6VDC)				
50110677	USB-converter cable for HFM/ HFU, Base Hx520, length 2m				

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-No. 50035421

Connection to Profibus DP

- MA 204i Profibus-Gateway with int. 5 Volt Power supply for mobile scanners
  Art-No. 50112893
- KB JST-HS-300 Connection cable MA20x with 9pin Sub-D, 5VDC at PIN9, length 300mm
  Art-No. 50113397

Connection to Profinet RT I/O

- MA 248i Profinet-Gateway with 5 VDC power supply for Hand held devices
  Art-No. 50112892
- KB JST-HS-300 Connection cable MA20x with 9pin Sub-D, 5VDC at PIN9, length 300mm
  Art-No. 50113397

Connection to Ethernet TCP/IP

- MA 208i Ethernet-Gateway with 5 VDC power supply for Hand held devices
  Art-No. 50112892
- KB JST-HS-300 Connection cable MA20x with 9pin Sub-D, 5VDC at PIN9, length 300mm
  Art-No. 50113397

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