HERMOS
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RFID

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RFID

Englisch

Customer manual

LFM 4x Reader E84 Rev1.5

0. Table of contents

1. Introduction

The LFM 4x Reader E84 complies with the "Radio and Telecommunications Terminal Equipment Act and Directive 2014/53/EU (RED)".

CE

These operating instructions are intended for the operator who must pass these on to the personnel responsible for installation, connection, use, and repairs of the machine.

The operator must ensure that the information contained in these operating instructions and in the accompanying documents has been read and understood.
The operating instructions must be kept at a known place that is easy to reach, and they must be consulted if there is the slightest doubt.

The manufacturer assumes no responsibility for damage to persons, animals, or objects or to the unit itself arising from the improper use or the disregard or insufficient consideration to the safety criteria contained in these operating instructions or based on modifications of the unit or the use of unsuitable replacement parts.

As of: July - 2023

1.1 Using the device

The device is exclusively used to read and write passive LF transponders.
Any other use of the machine or any use beyond its intended purpose is considered non-intended and thus improper.
In this case, the device safety and the device protection provided may be compromised. HERMOS AG is not liable for damages resulting from such use.
The device was developed for the use in an industrial environment as a built-in device in other systems. It was not developed as a stand-alone or mobile device in a non-industrial environment, such as dome- stic, vehicle or open air use.

Intended use also includes the following:

- Following all the operating instructions
- Following all the safety instructions

Improper use, which can endanger the unit, the user and third parties, include:

- The use of the device contrary to its intended use
- Changes to the device as well as attachments and conversions
- Operating the unit when there are obvious problems

WARNING

Danger of injury due to unauthorised modifications

There are risks from unauthorised modifications on the device.
Only original spare parts from the manufacturer must be used. No modification, attachment or conversion may be performed on the device without the permission of HERMOS AG.

WARNING

Danger of injury and interruption of operation due to improper use

There are risks through the improper use of the device.

The device must only be used according to its intended use.

2. Version history

Version	Date	Author	Amendments
1.5	12.05.2017	HERMOS AG, RK	Initial version of customer documentation translated from german revision V1.5

3. Used abbreviations and designations

RFID	Radio Frequency Identification
LF	Low Frequency 134,2 kHz
SEMI	Semiconductor Equipment and Materials
SECS	SEMI Equipment Communications Standard
HSMS	High-Speed SECS Message Service
DHCP	Dynamic Host Configuration Protocol

4. General instructions

All previous versions of this document lose their validity with the issue of this version.

We compiled the information in this document according to the best of our ability. HERMOS AG does not guarantee the accuracy and completeness of the information provided in this document and is also not liable for consequential damages based on faulty or incomplete information.

4.1 Objective of the product manual

The product manual serves as support and contains all the necessary information that must be followed for general safety, transport, installation and operation.

The product manual with all safety instructions (as well as all additional documents) must be:

- Followed, read and understood by all persons working with the unit (especially knowledge of the safety instructions)
- Easily available at all times to all persons
- Consulted if even the slightest doubt arises (safety)

Objectives:

- Prevent accidents
- Increase the service life and reliability of the unit
- Reduce the costs of production downtime

4.2 Warranty and liability

The „General Terms and Conditions of Sale and Delivery“ of HERMOS AG shall apply.

The warranty period is 24 months beginning with the delivery of the device, which is verified by the invoice or other documents.

The warranty includes repairs of all damages to the unit that occur during the warranty period, and were clearly caused by material or manufacturing defects.

Warranty and liability claims in the event of personal injury or property damage are excluded if they arise from one or more of the following causes:

- Improper use of the unit
- Disregarding the information in the operating instructions
- Unauthorised structural modifications of the unit
- Insufficient maintenance and repairs
- Disaster events due to impact with foreign objects or force majeure

5. Safety instructions and warnings

5.1 Scope and symbols

Follow the general safety instructions as well as special safety instructions included in the chapters.

The unit was built according to state-of-the-art technology and recognised safety regulations. In order to prevent danger to life and limb of the user, third parties, or the unit, only use the unit for its intended purpose and in perfect condition with regard to safety.

Bodily injuries and/or property damages resulting from non-compliance with the instructions pro- vided in the operating instructions are the responsibility of the company operating the unit or the assigned personnel.
Faults that may compromise safety must be eliminated immediately.

DANGER

Risk of death, injury and property damage.

There is a risk of danger due to disregard of the product manual and the safety information contained therein.
Read the product manual carefully before putting the unit into operation for the first time. Fulfil all required safety conditions.

5.2 Safety symbols - according to DIN 4844-2

The following special safety symbols in accordance with DIN 4844-2 are used at the corresponding passages in the text of this product manual and require special attention depending on the combi- nation of the signal word and symbol.

DANGER

Risk of injury due to disregarding the safety symbols.

Risks exist when disregarding warnings in the operating instructions. Follow all warnings.

5.2.1 Mandatory signs

	Observe additional information		Use safety goggles
	Wear ear protection		Wear safety shoes
	Important note		

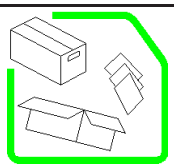
5.2.2 Warning signs

	Warning of a hazardous area		Warning of hazardous electrical voltage
	Warning of electromagnetic radiation		Warning of flammable substances
	Warning of explosive substances		Warning of electrostatically sensitive components

5.2.3 Prohibition signs

	Unauthorised access is prohibited		Fire, open flame and smoking prohibited
	Switching prohibited		Prohibited

5.2.4 Other signs

	Verpackungsmaterial vorschriftsgemäß entsorgen		Recycling

5.3 Obligations

5.3.1 Operator's obligations

A safe condition and use of the unit is a requirement for a safe operation of the unit. For that reason, the operator has the obligation to ensure that the following points are adhered to:

- ⇨ The unit may only be operated by trained and authorised personnel.
- ⇨ Prohibit unsafe or dangerous working methods! If necessary, check the conduct and actions of its personnel!
- ⇨ Have personnel who must be trained, instructed or within the scope of general training work only on the unit under the supervision of an experienced person!
- ⇨ Have the personnel confirm by their signature that the operating instructions have been understood!
- ⇨ Precisely establish responsibilities according to the various task areas (operation, installation)!
- ⇨ Operating personnel must be required to immediately report any occurring and identifiable safety deficiencies to their superior!

5.3.2 Responsibilities of operating personnel

The operating personnel are obligated to contribute to the prevention of work accidents and their consequences by their personal conduct.

WARNING

Risk of injury due to insufficient personnel qualifications

There are dangers to personnel and the proper operation due to inadequately qua- lified personnel.
Only trained personnel may operate the unit.
New operating personnel must be instructed by the existing operating personnel. The operator must precisely regulate the personnel's areas of responsibility, com- petence, and monitoring precisely.
The personnel for the areas of responsibility mentioned above must have the corresponding qualification for this work (training, instruction). If necessary, this can be done by the manufacturer on behalf of the operator. In case of disregard, all warranty claims are void.

5.3.3 ESD Instructions

CAUTION

Static electricity can damage electronic components in the unit. All persons who install or maintain the unit must be trained in ESD protection.

ESD protective measures must be applied when opening the unit.

⇨ Disconnect the power supply prior to removing or adding components!

⇨ Observe the basic principles of ESD protection

⇨ Take the appropriate ESD precautionary measures

5.4 Residual risks

Despite all precautionary measures taken, there may still be residual risks that are not apparent. Adhering to the safety instructions, the intended use, and the product manual as a whole can re- duce residual risks.

DANGER

Danger caused by electrical current
Electrical residual energy remains in lines, equipment and devices after shutting down the device.

Only qualified electricians may perform work on the electrical supply system.

ATTENTION

Disconnect the unit from the power supply system if active parts of the unit can be accessed using tools. Access is only permitted by authorised personnel.

Regularly check the electrical equipment of the unit. Regularly check all moving cables for damage within the scope of maintenance and repair work.

DANGER

Dangers of fire and explosion
There is a risk of fire and explosions in the vicinity of the device.

Smoking, exposed flames and fire are strictly prohibited in the vicinity of the unit. Do not store any flammable liquids within the hazardous area of the device.

A fire extinguisher must be kept in the vicinity of the device.

WARNING

Warning of electromagnetic radiation
Electromagnetic radiation develops when transmitting and receiving data. Arrange the antenna in such a position that it is not in the vicinity or make

contact with the human body while transmitting.

The device satisfies the standard EN50364:2010 (Human Exposure).

5.5 Supplemental instructions

- ⇨ Read and understand all safety and operating instructions prior to installing and operating the device.
- ⇨ This documentation was written for specifically trained personnel. The installation, operation and error handling may only be carried out by specifically trained personnel.
- ⇨ Keep these instructions. Keep this documentation in a location that is accessible to all personnel involved with the installation, use, and error handling of the device.
- ⇨ Follow all warnings. Follow all warnings on and in the device and in the documentation.
- ⇨ Install the unit only in accordance with the manufacturer‘s instructions.
- ⇨ Use only the accessories and cables from the manufacturer.
- ⇨ Troubleshooting that is not described in the chapter a service and troubleshooting may only be performed by the manufacturer.
- ⇨ When connecting cable connections, only pull on the plug and not on the cable.
- ⇨ Only use spare parts specified by the manufacturer.

The provisions of the accident-prevention regulations of the government safety organisations always apply to all work on the unit.

- ⇨ Applicable, legally binding accident prevention regulations.
- ⇨ Applicable binding regulations at the place of use
- ⇨ Technical standards for safety and professional work
- ⇨ Existing environmental protection regulations
- ⇨ Other applicable regulations

5.5.1 Regulations and certifications

The electrical design and documentation satisfy the DIN / VDE, EN / IEC regulations.

6. Functional description

6.1 General information

LF reading devices are radio frequency identification systems that use radio transmission to read or write data of LF transponders (134,2 kHz), which operate as tamper-proof electronic tags. The LF reading devices communicate with common transponders (134,2kHz) according to ISO 18000-2 and ISO 11785 that are available on the market.

The device is designed for 4 load ports and has connection options for 4 RFID reading heads with antennas, sensors and LEDs.

In addition, barcode scanners with RS232 interface can be connected via 4 SubD sockets for each port, which are automatically activated if no RFID tag is detected.

The data is transmitted via the existing interface with the preset transmission parameters. If several interfaces to the host are available and connected, the transmission always takes place on the last interface used. The data is embedded in a defined communication protocol and exchanged between reader and host.
In addition, these devices offer 4 interfaces for communication with an automatic transport system according to the SEMI Standard E84. Each of the 4 RFID ports is assigned an E84 interface and can therefore be used for automatic loading or unloading of the load port.

6.2 Basic functions - operating modes

During normal operation, the LF reading device supports various basic functions:

- Heartbeat function, software version query
- Scanning of transponders in the antenna area
- Reading data
- Writing data
- Locking data
- Setting and reading out parameters
- Setting and querying inputs and outputs

The LF devices can be set in 3 other operating modes by setting the parameters: Polling operation (optional), sensor-triggered automatic reading and test mode.

6.2.1 Normal operation

During normal operation, the LF reading device is immediately ready for operation after a reset. It does not perform any automatic actions in this mode (standby). During normal operation, actions are triggered by protocol commands from the host.
A scanning procedure or reading in the data area is initiated by a command of the host system using the communication protocol.
In addition to the actions triggered by the host, a corresponding message can be automatically sent to the host and an automatic reading operation can be started by activating or releasing a sensor. When the reading operation is successful, the read data is immediately transmitted to the host. If several antenna ports are occupied simultaneously, the reading operations are processed sequentially.
Writing actions (data saved to a transponder) are generally only possible via commands from the host.

6.2.2 Polling mode

LF reading devices can be set into a continuous reading state, which is referred to as polling mode. The device then performs reading operations at regular intervals and outputs the corresponding data of the read LF transponder.
The reading device also continues carrying out protocol messages in polling mode. This may, however, result in delays in the poll rhythm. The polling functionality is optional customer-specific available!

6.2.3 Sensor-triggered operation

Device versions with IO module (at least 1 input) offer the function of a sensor-triggered automatic reading operation. The reading device automatically performs a reading operation when the in- put is triggered. The type of action (inventory/reading) can be defined with the parameters „Read mode“ and „Read page“.
The read data is automatically sent to the host.
The result of the reading operation (successful, not successful) can be optionally output via I/O s of the respective antenna port. With the E84 reader, the sensor-controlled automatic readout via special feature parameter is deactivated in the delivery state.

6.2.4 Test module

The HERMOS LF reading devices support a test mode that facilitates setting up the antenna and checking the reading ranges during commissioning. HF reading devices feature several DIP switches on the housing. These switches can be used to activate test mode.
The functions in test mode are described on a sticker located on the reading device housing. The evaluation of the DIP switch depends on parameters.

If the device is in test mode, the red status LED flashes at about 1 Hz. The yellow status LED then indicates the status of the test mode. If the read or write process was unsuccessful, the yellow LED flashes at the read or write frequency. If the read or write process is successful, the yellow LED remains permanently lit.

⇨ see also chapter **„DIP-switch“**

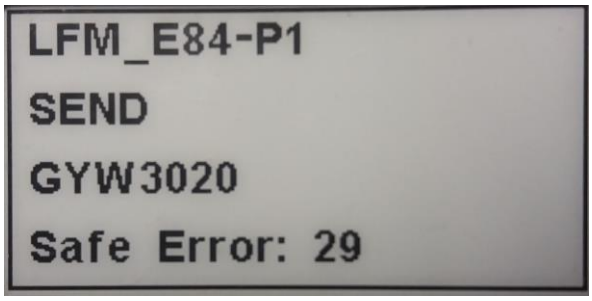
6.2.5 E84 mode

The HERMOS LF reader provides each of the 4 antenna ports with a 25-pin standard E84 interface. The LF reader takes on the role of passive equipment.
The following signals are served: CS_0, CS_1, TR_REQ, L_REQ, U_REQ, READY, BUSY, COMPT, HO_AVBL and ES. CS_0=HIGH and CS_1=LOW is expected as the address.

The E84 communication was implemented according to the SEMI E84-0305 standard.
The E84 communication is monitored by the standard timers TP1, TP2, TP3, TP4 and TP5, which are implemented with the default values. During error-free E84 communication, the yellow status LED on the reader also flashes slowly at 0.5 Hz. If there is no E84 communication, the yellow status LED on the reader goes out. If the reader is in test mode (maintenance mode), all 4 antenna ports are switched to manual E84 access mode, which prevents valid E84 communication.

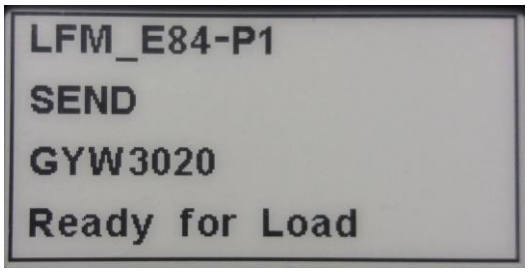
If a faulty communication is detected, a safe or unsafe error state is generated depending on the error. An unsafe error state is only cleared when, in addition to the monitored E84 input signals, no more errors are detected by the sensor. A safe error condition, on the other hand, is already resolved when the monitored E84 input signals have been reset.

If the internal display data structure is used (can be parameterized via Par. 112 Display Setup, then the current E84 status is shown in line 4 of the respective display. In the error state, the error is output on the corresponding port display in line 4 and the yellow status LED flashes quickly at 2 Hz as long as the error is present.



Fehlercode	ALID S5F1	Description
8	21	TP1 Timeout arrived
9	22	TP2 Timeout arrived
10	23	TP3 Timeout arrived
11	24	TP4 Timeout arrived
12	25	TP5 Timeout arrived
16	27	Unload not allowed
17	28	Load not allowed
18	29	Unexpected Load
19	30	Unexpected Unload
20	31	CS_0 bzw. CS_1 is wrong
21	32	Unexpected condition for signalstate Valid=ON
22	32	Unexpected condition for signalstate Valid=OFF
23	32	Unexpected condition for signalstate TR_REQ=ON
24	32	Unexpected condition for signalstate TR_REQ=OFF
25	32	Unexpected condition for signalstate BUSY=ON
26	32	Unexpected condition for signalstate BUSY=OFF
27	32	Unexpected condition for signalstate COMPT=ON
28	32	Unexpected condition for signalstate COMPT=OFF
29	33	Switch to maintenance mode / manual access mode
30	33	Switch to operation mode / normal access mode

After the end of a valid loading and unloading process with error-free E84 communication or if an E84 error status has been reset, the display shows "Ready for Load" or "Ready for Unload" depending on the sensor status.

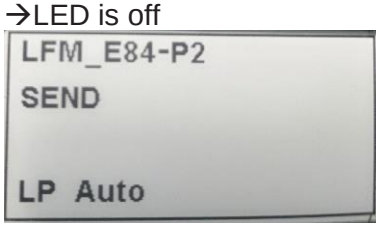


The parameter 112 Display Setup can be used to set that the internal display data structure is used to display the following information of the respective port in 4 lines:
Line 1: Shows the host name of the reader and the port number is appended with "-Px".
Line 2: Shows the station type of the respective port. This is set individually for each port via parameter 116.
Line 3: Shows the MID or the barcode that was determined via the read function function S18F9. Read errors or the removal of the foup also lead to an update of the line.
Line 4: Shows the current E84 status of the respective port.

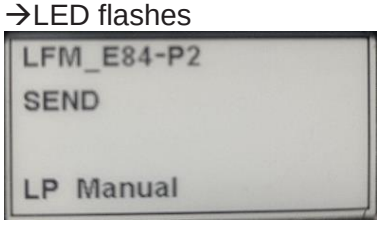
E84 Access Mode I/O Module:
Starting with software version V1.3FV00, a second optional I/O module is supported, which offers the option of changing the E84 access mode of the relevant port via an input per E84 port. There are two different ways of functioning, which depend on the selected CFP. The main difference here lies in the settings of parameter 121 E84 Access Mode Setup.

CFP1: A sensor input should make it possible to switch the reader to the E84 Access Mode Manual in order to prevent further automatic wafer handling. Automatic wafer handling can then be enabled again via the same sensor input. A sensor input (2nd sensor !!) is provided via the optional I/O module, which is operated in button mode and used for switching between automatic and manual E84 access mode. In addition, the optional I/O module provides an output for each E84 port that displays the current E84 manual access mode of the port in question:

Automatic E84 access mode:
→LED is off



Manuel E84 Access Mode:
→LED flashes



As of software version V1.4FV00, a new E84 Access Mode I/O module with 2 inputs and one output per E84 port is supported. The additional input per E84 port (3rd sensor) is used to create another possibility to switch to the E84 Access Mode Manual. As long as the input reports the On

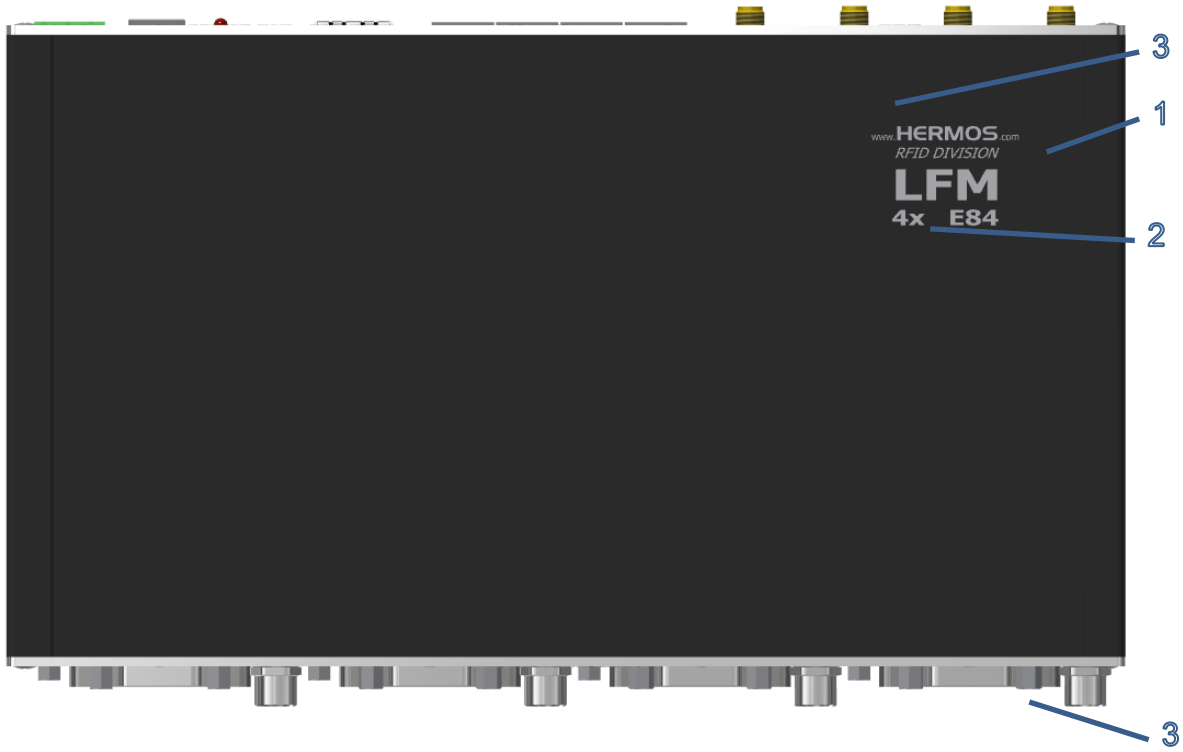
state, the E84 port remains in manual access mode. Only when the input (3rd sensor of the E84 port) has the status Off can you switch back to the E84 Access Mode Automatic as before using the button (2nd sensor of the E84 port).

CFP2: A laser sensor is connected to the optional I/O module, which in the E84 process when setting up a carrier/foup checks whether this is permissible for carrier/foup handling. In the event of an error, a switch is made to the E84 manual access mode. It only switches back to the E84 Automatic Access Mode when the faulty carrier/foup is removed.
The current E84 status is displayed on the respective antenna port on the two status LEDs:
Red Port LED On: The reader port is in E84 Manual Access Mode
Both port LEDs are flashing: An E84 triggered wafer handling process is currently active
Green Port LED On: An E84 triggered wafer handling process has been successfully completed
Both port LEDs off: Initial E84-IDLE mode

The optional I/O module for the E84 access mode is parameterized using parameters 118 to 130.

6.3 Illustration

6.3.1 Top view



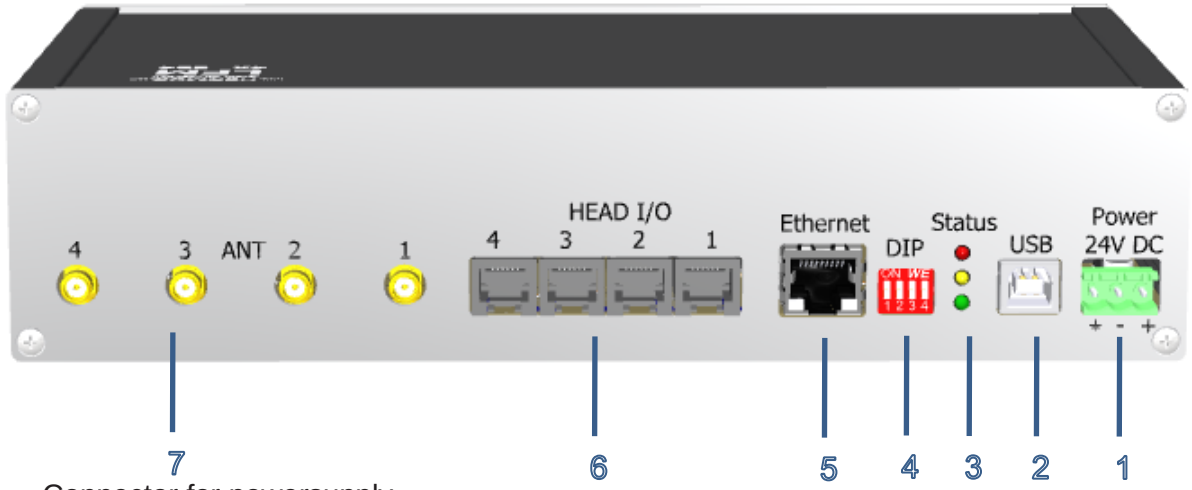
1. Black and white anodised aluminium housing

2. Reading decvice type imprint

3. Connectors

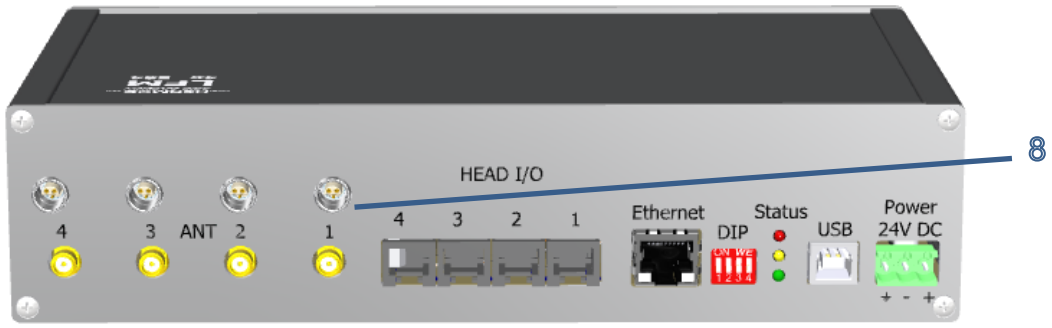
6.3.2 Front View

Standard version without I/O (item number **HRF.R.LFM.4S.SB.EB.10A)**

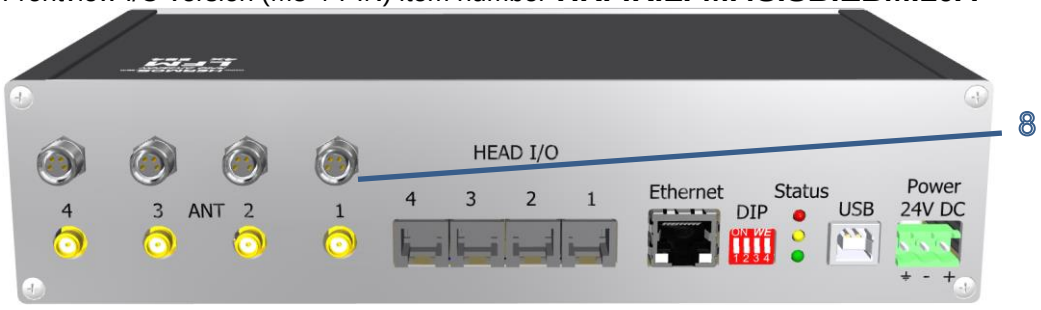


1. Connector for powersupply
2. USB Connector (Typ B)
3. Status- and Power LEDs
4. DIP-Switches
5. Ethernet Interface
6. I/O Connectors Read Head (RJ12)
7. Antenna connectors (SMA)

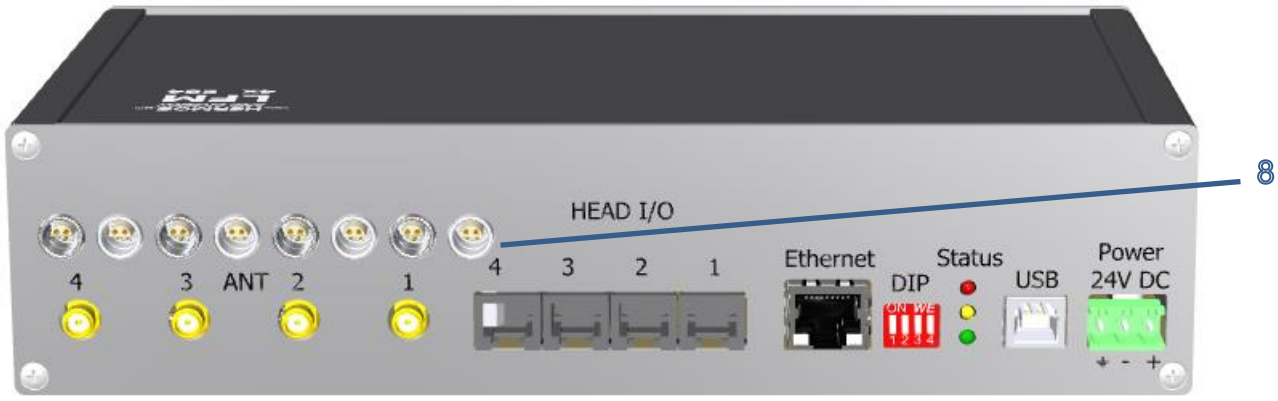
Frontview I/O version (Lemo 4-PIN) item number **HRF.R.LFM.4S.SB.EBC.10A**



Frontview I/O version (M8 4-PIN) item number **HRF.R.LFM.4S.SB.EBM.10A**



Frontview I/O version (Lemo 4-PIN for any button and Lemo 3-PIN for sensor)
Item number **HRF.R.LFM.4S.SB.EBC4.10A**

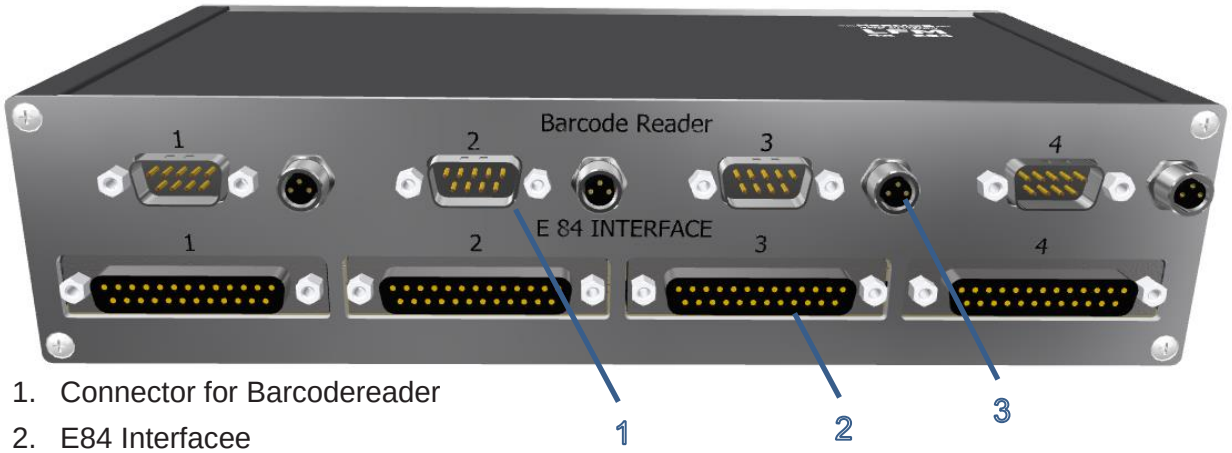


8. Connectors for digital In- and Outputs (optional)

Component	Description
Powersupply	Three-pin socket for connecting the 24V DC power supply.
Power-LED	The Power LED shows that the operating voltage is present and the reader is ready for operation.
State-LEDs	The two status LEDs are used for reading and writing feedback in test and polling mode. If the device is in test mode, the red status LED flashes at around 1Hz. The yellow status LED then shows the status of the test mode. If the reading or writing process was not successful, the yellow LED flashes with the reading or writing frequency. If the read or write process is successful, the yellow LED remains on. In normal operation, if an error occurs, it is displayed via the red LED: Red LED permanently on: read error (no tag) Red LED flashing quickly: antenna error (tuning, cable break). This display is automatically reset with the next valid reading. After a restart, a short self-test of the LEDs, then the log is displayed: SECS: red lights up briefly ASCII: yellow goes on briefly (protocol not realized)
DIP-Schalter	DIP switch 4 starts automatic antenna tuning. DIP switch 3 activates a test mode. DIP switches 1 and 2 are used for antenna selection.

Ethernet Interface	The reader has an Ethernet interface. Host communication with the device can take place via the 10/100 BaseT interface.
USB Interface	The reader has a USB interface with RS232 emulation (SiliconLabs. CP210x driver required). This interface is mainly intended for service purposes.
Connectors for In- and Outputs Port 1 - 4	The I/O connectors are specially designed for connecting reading heads with integrated sensors and LEDs. A display can then be connected to each of these reading heads. All contacts are preassigned accordingly.
Antenna-connectors Port 1 - 4	SMA connectors for connecting the antennas.

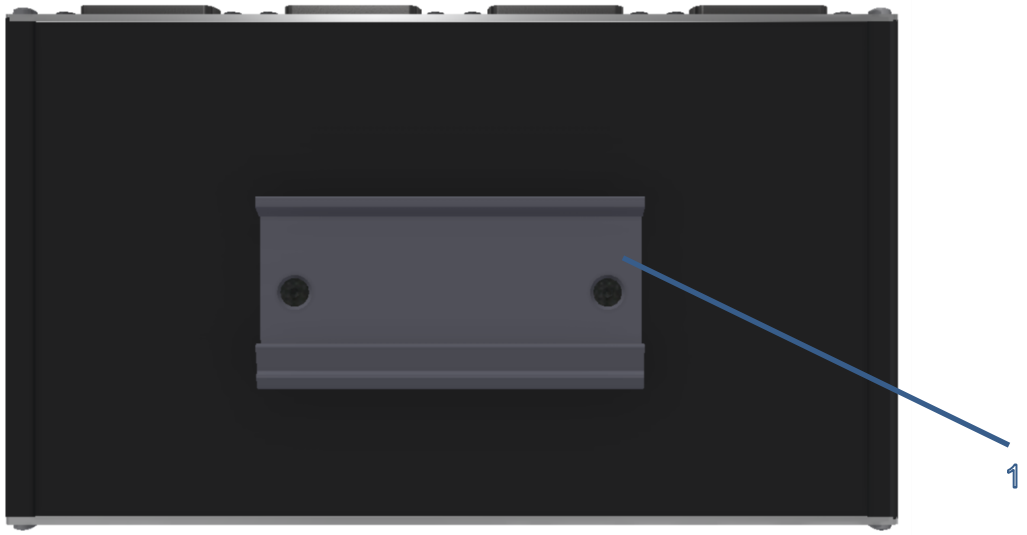
6.3.3 Back view



1. Connector for Barcodereader
2. E84 Interfacee
3. Powersupply BC-Reader

Component	Description
Connectors for Barcode-Reader Port 1 - 4	9-pin SubD connector (male) for connecting external barcode readers. Implemented on the software side: Keyence SR-2000
Connectors for E84 Interfacee Port 1 - 4	25-pin SubD connector (female) for connecting E84 transmission cables
Connector for Powersupply Barcode-Reader Port 1 - 4	3-pin M8 connector (female) for connecting external barcode readers (e.g. Keyence SR-2000)

6.3.4 Bottom view



1: 35mm DIN rail

6.4 Technical Specification

Technical data	
Voltage (protected against reverse polarity)	20 – 28 V DC,
Power consumption (passive, reading, pulse-by-pulse)	200mA@24V, 300mA, max.500mA
Fuse type Nano2	750 mA
Operating temperature	-0 to 50 °C
Storage temperature	-20 °C to 70 °C
Permissible humidity at 50°C	25 – 80 %
Transmission frequency	134,2 kHz
Ethernet interface	10/100 BaseT,
Protocol	SECS / HSMS
Housing material	Aluminium, black and white anodised
Protection	IP40
Reader dimensions	240 x 140 x 55 mm
Weight	approx. 850 g (includes second I/O module with 2.sensor, 3.sensor not realized)

The device label with the CE label, article and serial number are located on the side of the reading unit.

6.4.1 Power supply and current input

Description	Min.	Typ	Max.	Unit
Voltage (reverse polarity protected)	20	24	28	V (DC)
Current consumption (Read/Write)		300	500	mA
Current consumption with barcode reader		2000	5000	mA

6.4.2 Device labels

The device label is located on the reading unit housing.
It contains a CE mark, article/serial number and the MAC address.

1. Designation
2. Article number (variants)
3. Serial number (example)
4. Hermos workorder nr
5. MAC address
6. Manufacturer

LFM 4x Reader E84
P/N: HRF.R.LFM.4S.SB.EB.10A
S/N: 2009HAG00123
P/O: HKxxxxxx
MAC: D8:80:39:xx:xx:xx
HERMOS AG

CE

6.4.3 FCC-Label FCC ID: 2AP5OLFME84

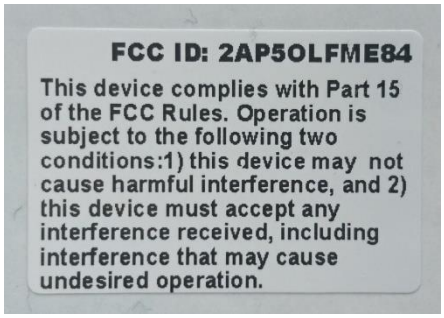
The Federal Communications Commission (FCC) warns the users that changes or modifications to the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF exposure statement (mobile and fixed devices)

This device complies with the RF exposure requirements for mobile and fixed devices. However, the device shall be used in such a manner that the potential for human contact during normal operation is minimized.

- FCC §15.105 (a):

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



6.4.4 Test mode sticker

The device label is located on the reading unit housing. By setting the **DIP-switch** 3 the test mode is activated. The test mode read or write is set with the DIP switch 4. The selection oft he antenna port is changed by the DIP switched 1 and 2.

Further functions see section **DIP-switch**.

DIP Switches

DIP /Ant Port:		**1**	**2**	**3**	**4**
1		off	off	on	on
2		off	on	off	on
3	Testmode	on/off			
4	3 off: Start Antenna Tuning 3 on: Off-Read / On-Write				

7. Installation

Follow the basic safety instructions in the chapter Safety instructions.

7.1 Safety instructions

	The unit is exclusively designed for indoor use in an industrial environment. The unit may only be installed indoors with a temperature and humidity level with in the range of the specified technical module parameters.
	Never use the unit near or in water. Never pour liquids of any type over the unit. However, if the unit should still come in contact with liquid, disconnect it and have it checked by a technician.
	Do not install the device near heat sources such as radiators, heat regis- ters, stoves or other devices (including amplifiers) that generate heat. Do not install the unit in a flammable environment.
	Never expose the device to extreme temperature fluctuations, since con- densation otherwise develops inside the unit and causes damages.
	Do not install the device in the vicinity of voltage lines or other power lines with which they could collide (for example, drilling), which could result in serious injuries or even death.
	The device (especially the antenna) should not be installed in the immediate vicinity of electrical equipment such as medical devices, monitors, telephones, TV sets and magnetic disks, and metal objects. This could result in reduced read and write ranges.
	Never use the unit in explosive areas (such as paint warehouses).
	Do not use the device in areas where it is exposed to vibrations or shocks.
	The installation location must be adequately illuminated during the installation.
	Never install the unit during a lightning storm.

	Make sure that the installation meets the requirements of the FCC (country specific) for human exposure to radio frequencies.

7.2 Qualified installation personnel

	The unit must only be installed by specially trained personnel. If you have any doubts about the qualifications, please contact the manufacturer.
	If the unit is operated by untrained personnel, the reading device and or connected devices may be damaged.

7.3 Unpacking

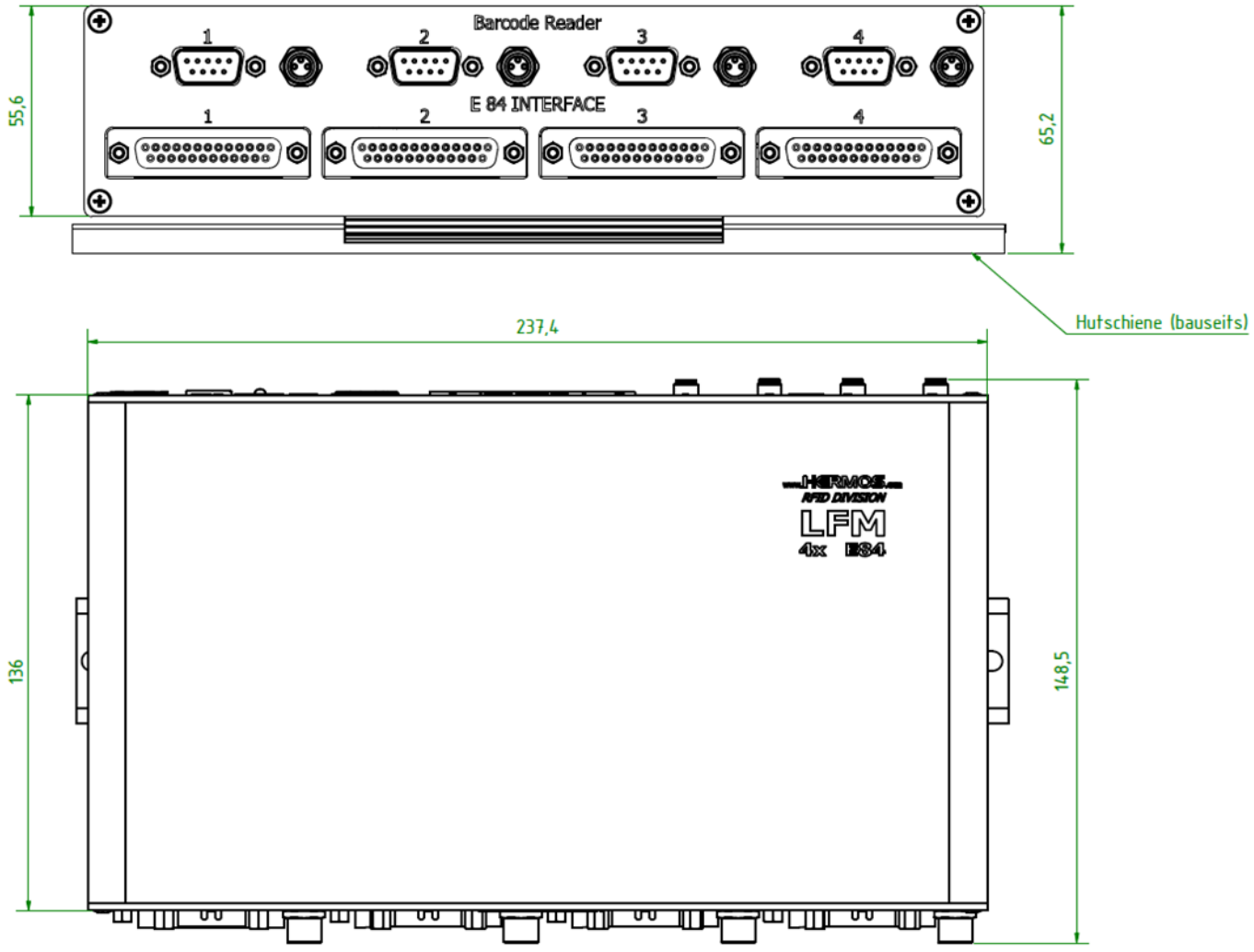
The LF reading device and the accessories can be packed customer-dependent in clean room conditions. In order to maintain this condition, the devices must be unpacked in clean room conditions.

	The packaging material consists of cardboard and foil. Dispose of these materials separately under the respective regulations of your country.

7.4 Mounting the device

	The mounting surface must be stable, non-flammable, dry and clean. If necessary, clean it before you install the device. Only use components, cable and mounting materials provided by HERMOS. Only mount the components at the designated locations and make sure that the operating and ambient conditions specified in the technical data are always maintained.

Dimensions



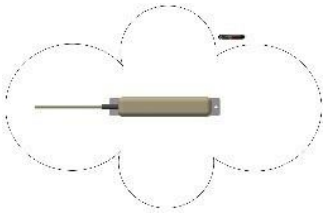
7.5 Installing the antenna

	When installing the antenna, observe the required reading and writing ranges. The reading device can only be used properly. If the transponder is located within the reading and writing range of the antenna.

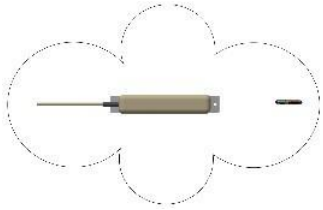
7.5.1 Positioning the antenna

The removal and alignment of the transponder tot he antenna is critical to ensure reliable reading and writing. The following diagram displays the optimum alignment and position of the transponder to the antenna. After positioning, the antenna must be tuned to the ambient conditions.
The tuning function can be started with the DIP switch 4.

Transponder parallel to the antenna axis:

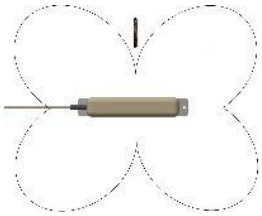


Transponder is outside the antenna range

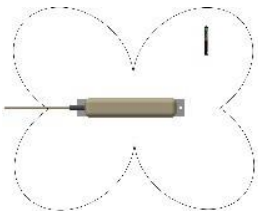


Transponder is within the antenna range

Transponder vertical to the antenna axis:



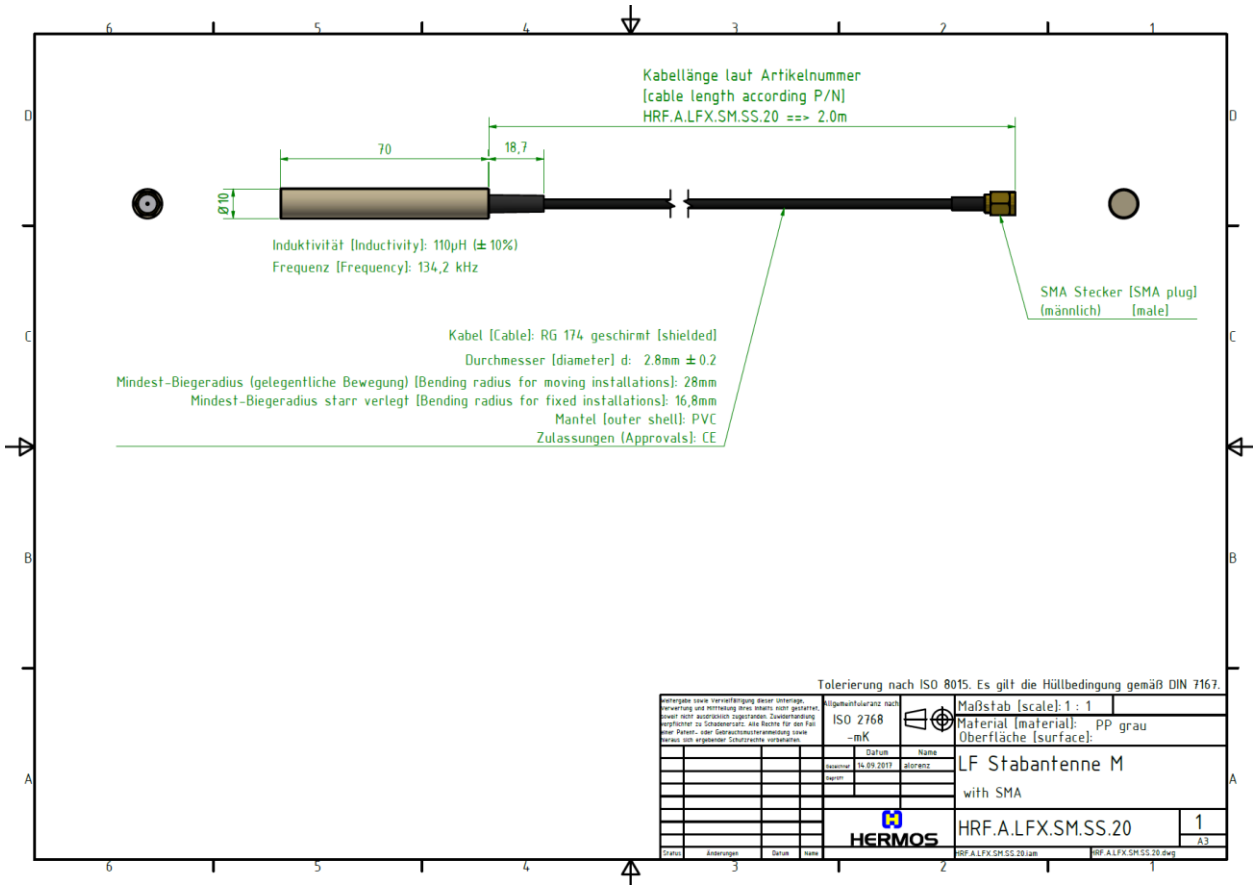
Transponder is outside the antenna range



Transponder is within the antenna range

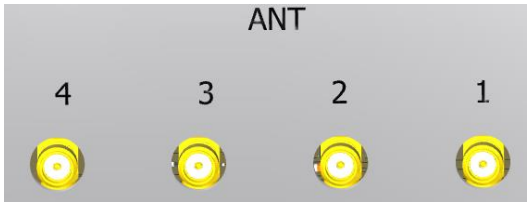
7.5.2 Antenna dimension

HRF.A.LFX.SM.SS.20



7.5.3 Connecting the antenna

Connect the antennas to the antenna connectors on the back of the reading unit. Note the labeling. The connection socket is of the type SMA (female). The antenna cable requires a male SMA connector.



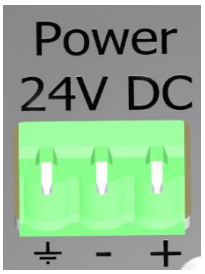
	Use the antennas and antenna cable from the manufacturer to ensure optimum reading and writing ranges. The outer connection of the antenna cable must not be connected to the reader or system ground. Connection points of extensions must be insulated.

7.6 Power Supply

The device can be connected to the system‘s internal power supply or an external power supply.

	There are risks if the device is supplied with the incorrect voltage. Only use cables, plugs and adapters from the manufacturer. Observe power ratings provided in the technical data.

PIN	Signal
1	GND
2	0 V
3	+24V DC



If the device is connected to the power supply, the power LED lights up.

7.7 DIP-switch

Test mode can be activated via the 4 DIP switches on the device. In test mode, a continuous reading operation is performed at the set antenna port and the result of the reading operation is displayed on the status LED.

The test mode is activated by setting DIP switch 3DIP switch 4 can be used to select between test reading and test writing The selection of the antenna port is changed using the DIP switches 1 and 2.

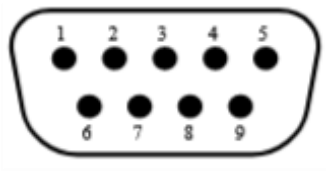
The DIP switches can be deactivated or activated by parameter.

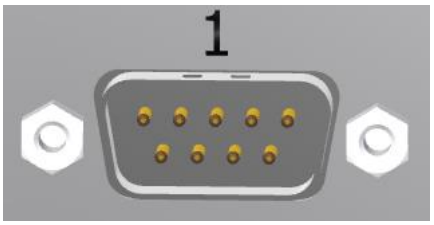
Switch	Function
1	Antenna connection selection off, off … Antenna connection 1 off, on … Antenna connection 2 on, off … Antenna connection 3 on, on … Antenna connection 4
2	
3	off: Operation mode on: Activated test mode
4	DIP 3 off: Deactivated test mode off->on Start Antenna Tuning DIP 3 on: Activated test mode Selection of the test function: off = Read, on = Write

7.8 RS232 connection for barcodescanner

The 4 serial interfaces for barcode readers are implemented as Sub-D connectors (9-pin, male). A supply voltage of 5V is also output at PIN 5 and 9 and can be used for appropriate barcode readers with low power consumption (e.g. Keyence BL 650 HA).

PIN	Signal
1	NC
2	RxD
3	TxD
4	NC
5	GND (0V DC)
6	NC
7	NC
8	NC
9	NC (+5V DC)





7.9 Connections for barcode scanner power supply

The reader offers 4 connection options for barcode scanners with high performance and 24V DC supply via separate M8 connection sockets (female).

PIN	Signal
1	+ 24V
3	GND
4	NC

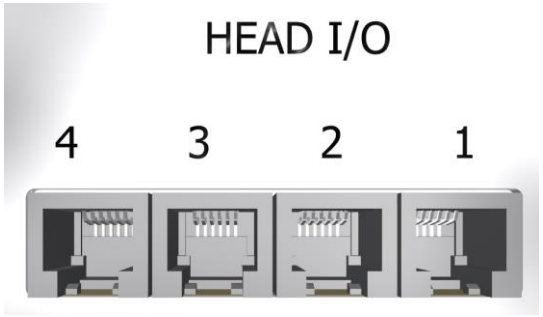
Polbild Buchse M8, 3-polig, Ansicht Buchsenseite

The 4 connection sockets are internally connected directly to the input voltage connection socket and protected by an internal common fuse with 4 A (slow).

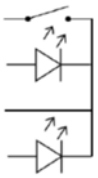
	Please ensure that the power pack is adequately dimensioned when using the connection sockets!

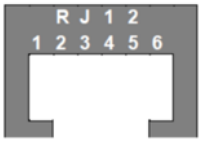
7.10 Ext. Inputs and outputs

The reading device offers the option of connecting reading heads via RJ12 connection sockets.



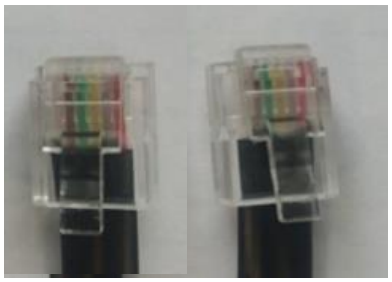
PIN	Signal
1	Tx Display
2	VCC (+3,3V/+5V)
3	INPUT
4	LED 2 (max.10mA)
5	GND
6	LED 1 (max.10mA)



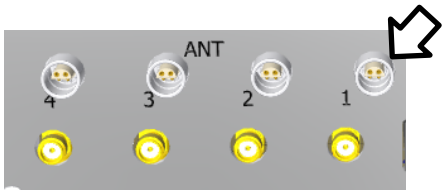


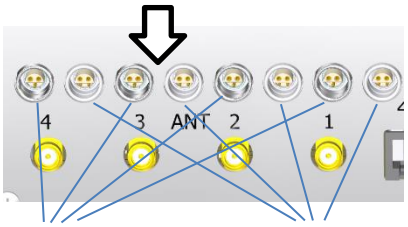
Front view

Connection cables (1 to 1 assignment) in various lengths are available separately as accessories


Picture shows 1:1 pin assignment of RJ12 connector

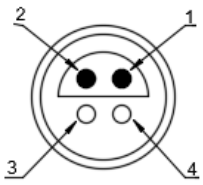
Readers with optional I/O connections are also available
Variant with I/O (4-pin LEMO socket 0S) for illuminated button and (3-pin LEMO socket 0S) for sensor
Item number **HRF.R.LFM.4S.SB.EBC.10A** and **HRF.R.LFM.4S.SB.EBC4.10A**



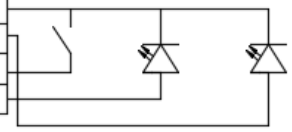


Pin-Assignment (view of the socket): 3-PIN 4-PIN

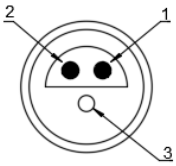
4-PIN



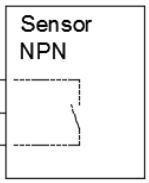
IN-/OUTPUT	
PIN	SIGNAL
1	GND
2	LED2
3	INPUT
4	LED1



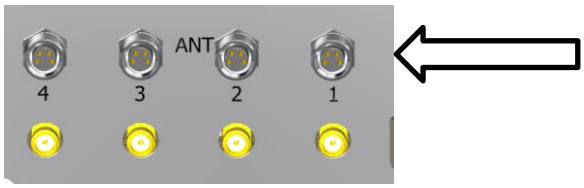
3-PIN



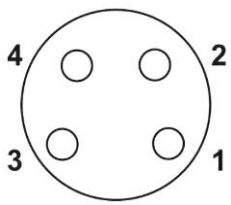
INPUT	
PIN	SIGNAL
1	GND
2	+12V
3	INPUT

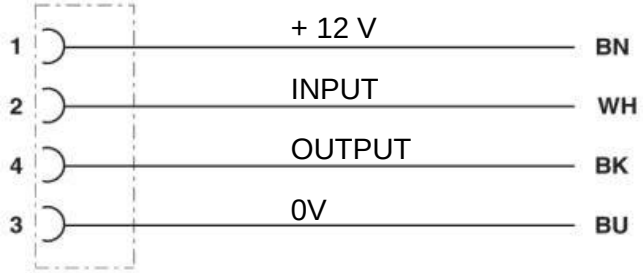


Variant with I/O (4-pin M8 socket) for laser sensor with input and output
item number **HRF.R.LFM.4S.SB.EBM.10A**



Pin-Assignment (view of the socket):





7.11 USB-connection

The LFM E84 reader with SECS protocol can be connected to any USB port of a running PC. Before connecting the reader, however, the driver for the virtual COM port must be successfully installed so that the connected device can be addressed via the virtual COM port. The driver is available in the download area of the RFID products on the HERMOS homepage:

https://www.hermos.com/digital-business/download/#/category/rfid-extended

You have to register to get an account for download tools and drivers!

→After downloading and unpacking the driver, the installation is started by running the CP210xVCPInstaller_x64.exe or CP210xVCPInstaller_x86.exe application.

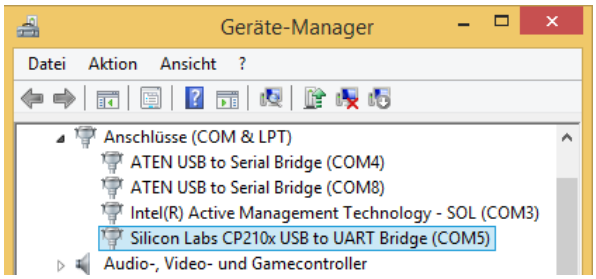
→When using a single USB reader, select the "SingleReader" driver. The reader can be operated on any USB port of the PC.

→If using several USB readers at the same time, select the "MultiReader" driver. A virtual serial interface is assigned to each USB port. A reader can be installed on each USB port of the PC.

→The USB reader is now plugged into a USB port of the PC, the computer recognizes the device and automatically starts the driver installation.

→Follow the further installation instructions and install the software via "Install software automatically". If the automatic installation fails, start the manual installation.

→If the driver is successfully installed and the USB reader is plugged in, it can be addressed via the virtual COM port. The associated virtual COM port is displayed as "Silicon Labs USB to UART Bridge" in the device manager of the control panel. The parameters of the serial interface can be found in Chapter 8.2.



8.Commissioning

8.1 Operating conditions

The following requirements must be fulfilled for smooth device operation.

1. The operating temperature must be within the scope of the values specified in the technical data.

2. The device must be connected to the power supply.

3. An antenna must be properly connected to the reading device.

4. A transponder must be within the reading and writing ranges of the connected antenna.

5. For normal operation, deactivate test mode after installation. (All DIP switches off).

8.2 The serial interface parameters (USB connector)

The following settings of the serial interfaces are set on delivery. The baud rate can be changed in the SECS protocol with the parameter 0x01.

	Signal
Baudrate	19200
Datenbits	8
Stoppbits	1
Parität	None

8.3 Parameter of the ethernet interface

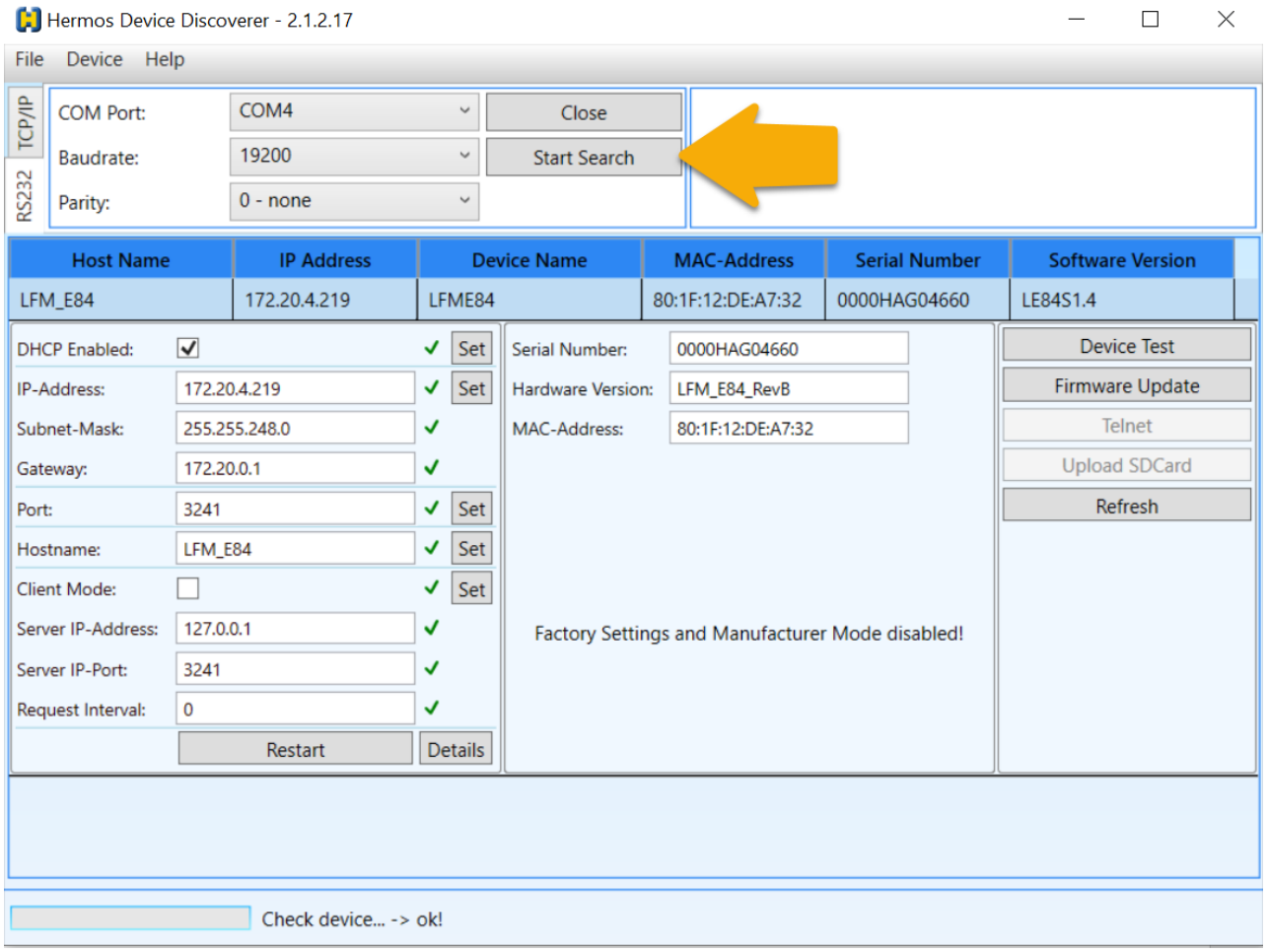
The unit is connected to the customer network via a 10/100BaseT Ethernet interface. The DHCP (Dynamic Host Configuration Protocol) is activated on delivery.

If there is not a DHCP server available in your network, a random IP address is set from the Zero- Conf range (169.254.0.0/16) and operations must still be performed to obtain an IP address. If an IP address could be obtained or with a static IP address, the device can be connected via TCP / IP port 3241 in the delivery state.

The HERMOS „DeviceDiscoverer“ is available for configuring the network setting.

8.3.1 Change networksettings with DeviceDiscoverer

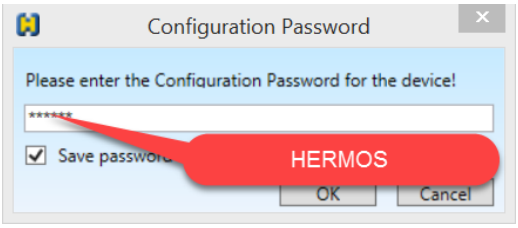
HERMOS components can be found in the LAN network and settings can be easily changed using the „DeviceDiscoverer“.



1. Select your network interface if you have several options on your PC.

2. Your network is automatically scanned for all HERMOS reading devices using the „Search Devices“ button.

3. Select the desired reading device in the list to open the network settings. Here, you can edit the network settings and apply them to the reading device by pressing the respective button. Use „HERMOS“ if you are asked to enter a password!

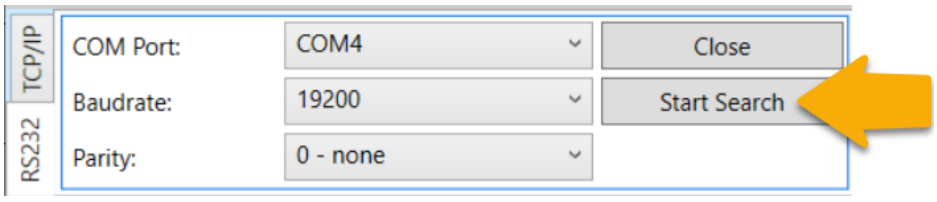


After parameters are changed, the reading device reboots and can be read in using „Search Devices“.

CAUTION

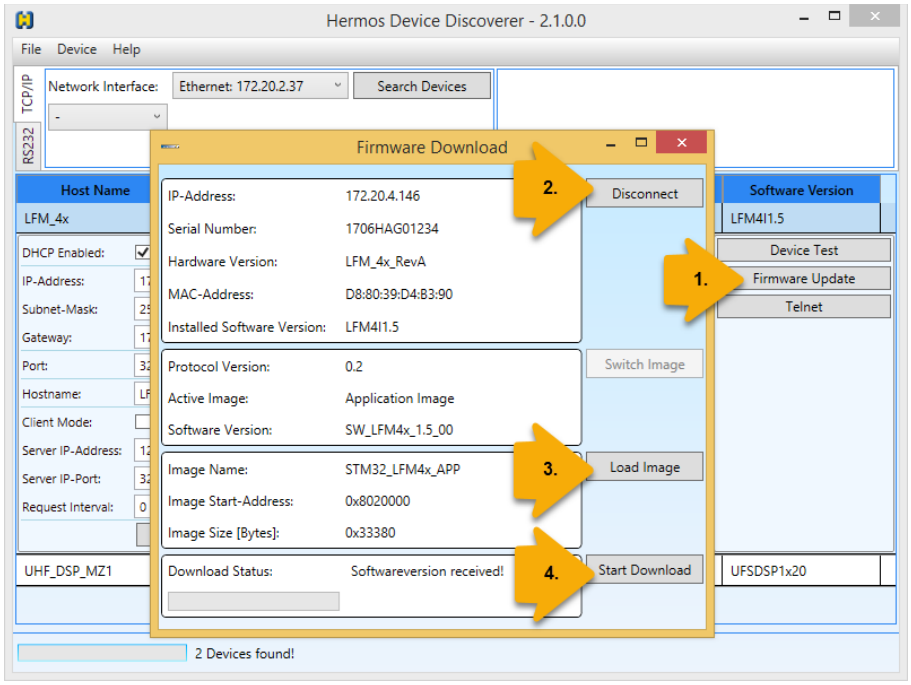
Changing network settings generally cause the reading device to reboot. This closes an existing HSMS host connection.

Alternatively, the reader can also be read in via the USB interface via a virtual COM port. See also serial port parameters:

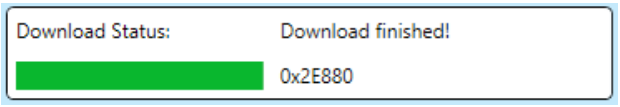


8.3.2 Firmware update with DeviceDiscoverer

Firmware updates can also be performed using the HERMOS „DeviceDiscoverer“. Start the tool with administrator rights and scan the network for all HERMOS devices.
To do an update, mark the desired reading device and select „Firware Update”.
Use „HERMOS“ if you are asked to enter a password!



1. Click the "Firmware Update" button to open the new Firmware Download window for the selected reader.
2. It is usually not necessary to open the download connection as this happens automatically. Otherwise, pressing the Connect button will open the download connection.
3. Select the new firmware file using the load image button.
4. Start the download process.
   Wait until the „Download Finished“ message appears.



CAUTION

During the download process, do not disconnect the power supply or interrupt the network connection.

8.3.3 Test Device with DeviceDiscoverer

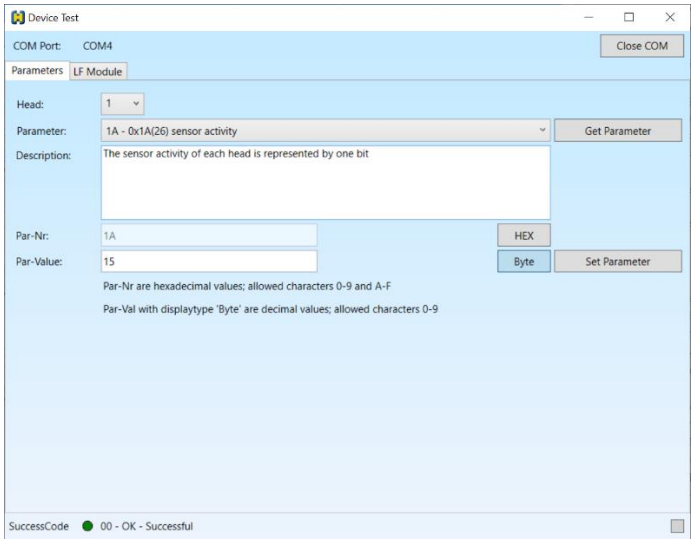
This feature is not yet supported by all HERMOS readers. It is available for LFM E84 readers.

Readers can also be tested with the HERMOS "Device Discoverer" if you have one support feature. Start the tool with administrator rights and search for the HERMOS device under test in the network. Select the desired reader and select the "Device Test" button independently of your interface. A further "Device Test" view is opened with which the addressed reader can be tested via the UDP protocol without having to disconnect any existing TCP / IP connection.

Parameters:
In the "Parameters" tab you can choose from a list of parameters that can be read and written.

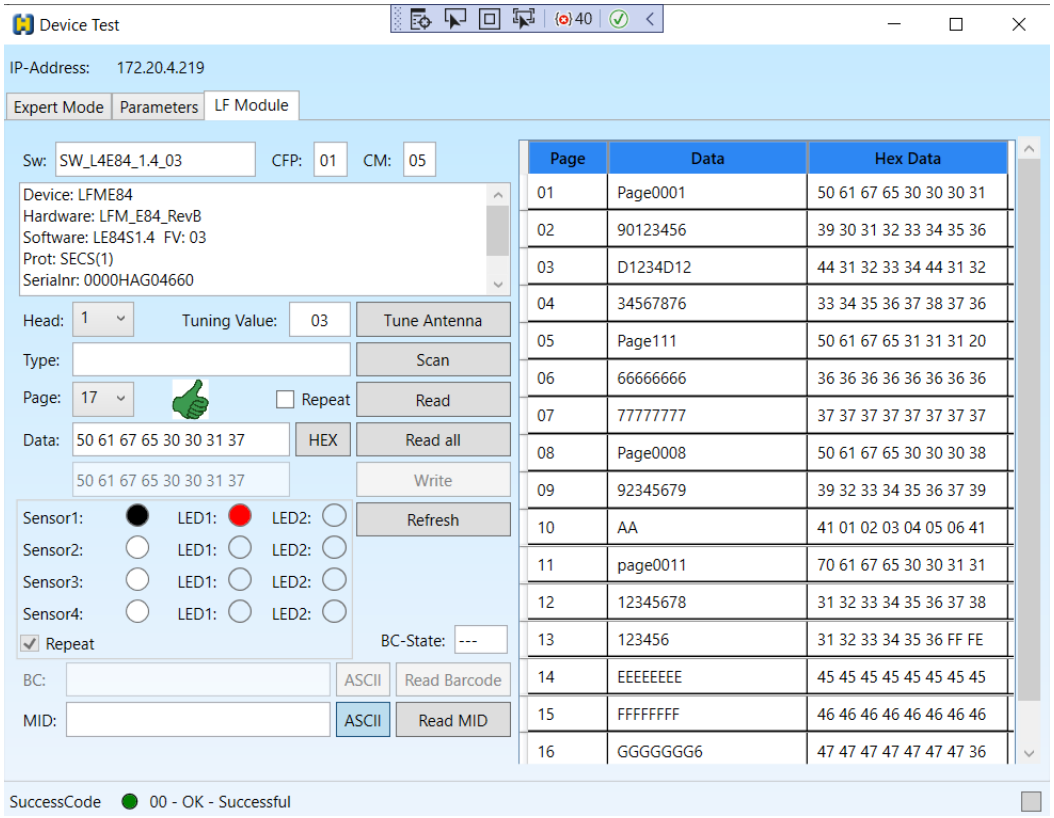
CAUTION

When setting and reading parameters, it must be carefully considered which communication protocol is currently set. Some parameters are defined differently in different protocols.

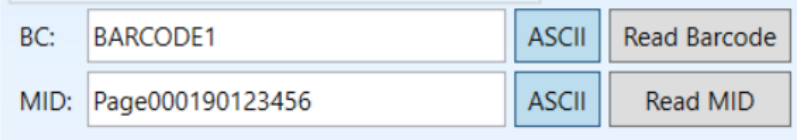


LF Module:

In the register "LF Module" a test reading can be carried out. One or more pages of a multipage transponder can be read out. The success code of the triggered reading is displayed in the status bar at the bottom of the window. Via a scan, the first page of every readable 134.2 kHz LF transponder is read out and displayed.



If a barcodereader at the selected port is connected than a barcode read can be triggered.



9. Operating

9.1 Operating personnel

The device should only be operated by specially trained personnel. If you have any doubts about the required qualifications, please contact the manufacturer.
The operation of the device without special expertise can result in damages to the device or on connected devices.

9.2 Protocol change

9.2.1 General

To communicate with a connected host system, the reader can support different ASCII and SECS/HSMS protocols. The protocol selection takes place by means of automatic protocol recognition.
The currently set protocol is displayed on the status LED during the boot process.
SECS: The red LED goes on briefly after self test
ASCII: The yellow LED goes on several times

The current realisation of the E84 reader only supports SECS/HSMS protocol !

9.2.2 Automatic protocol detection

The reader automatically adjusts to the protocol used by checking and evaluating the first message after a reset. The interface is changed accordingly when the protocol is changed and reinitiali- zed. This process can take several seconds. Already sent messages are lost. The newly recognized protocol is used for further communication. A renewed change is only pos- sible after another reset. Automatic protocol detection can be disabled by setting parameter 98 (0x62).

If the reader receives undefined or random characters, this may result in an accidental protocol change.
Automatic protocol detection can be activated/deactivated in parameter 98 (0x62).

The current realisation of the E84 reader only supports SECS/HSMS protocol and a automatic protocol recognition is not necessary and is disabled on default.

9.3 customer factoryparametersets CFP's

The reader LFM E84 can be delivered with a few Factoryparametersets CFP's. The settings of the Factoryparameterset CFP is part of the factory settings and can only be changed by Hermos. If customer needs another Factoryparameterset CFP setting, please ask Hermos for the necessary steps.

CFP0:

On default the 2. I/O modul is not activated and not used.

CFP1:

On default the 2. I/O modul is activated and used. The 2. I/O module distributes 2 additional sensors and one output. The sensors or switches are used for switching between E84 Active Mode and E84 Manual Mode. The output shows See also chapter E84 mode CFP1.

CFP2:

On default the 2. I/O modul is activated and used. The 2. I/O module distributes additional inputs and outputs to trigger a lasersensor for a lasersensorsensors and one output.See also chapter E84 mode CFP2.

10.SECS / HSMS Communications protocol

The SECS I standard defines a communication interface that is suitable for exchanging messages between the semiconductor processing systems and a host. A host is a computer or computer network that exchanges the information with the systems to carry out the production.

The standard does not define the data contained in the message. The meaning of the messages must be defined by a standard that defines the message content – e.g. by the SEMI Equipment Communications Standard E5 (SECS-II).
This message record describes the communication between a reading device with SECS-I and a host. The host and the RFID reading device can communicate via a RS232 interface (SECS-I) or an Ethernet interface (10/100BaseT) with HSMS protocol. The meaning of the messages is provided in the message details section in which the message content is defined.
Serial communication (SECS-I):
The data is transmitted or received as a serial bit stream with 10 bits per character in a supported data rate. A standard character has a start bit, 8 data bits and a stop bit. No parity bits or other controls are used for transmitting the individual bytes.
Default setting: 19200 / 8N1

Details about the data definition and the data transmission are provide in the SEMI Standard E4. (SEMI Equipment Communication Standard 1 Message Transfer SECS-I)

Ethernet communication (HSMS):
The reading device functions as a HSMS server. This means that it waits for a connection request from a HOST PC (client).
TCP/IP: IP-Adress xxx.xxx.xxx.xxx Port 3241
If there is a connection request from a HOST, a HSMS connection is set up and the SECS II messages defined in the message record are transmitted from the reading device to the respective HOST and vice versa. The HSMS connection remains intact until it is specifically terminated by the host or the reading device.
All reading devices available in the network (LAN) can be operated from any HOST PC. A HSMS reading device, however, can no longer be connected to more than one HOST simultaneously.
The network settings can be changed using a configuration tool provided by HERMOS. Each change to the network settings causes the unit to reboot and thus disconnects existing communication connections.

10.1 Structure of a message

The communication structure and process is defined by the SEMI Equipment Communications Standards E4, E5 and E37 (SECS-I, SECS-II, HSMS).

SECS message blocks always have a specified structure that consists of 1-4 length bytes, 10 bytes of message headers and message data.

	Byte	MSB	Description
Length	0		Length without checksum
Header	1	R	Upper Device ID (reader-ID)
	2		Lower Device ID (gateway-ID)
	3	W	Upper Message ID (stream)
	4		Lower Message ID (function)
	5	E	Upper block number
	6		Lower block number
	7		System byte 1
	8		System byte 2
	9		System byte 3
	10		System byte 4
Data	11-254		Message data
Checksum	255, 256		16 Bit checksum

The **length** contains all the bytes transmitted after the length byte with the exception of the two checksum bytes. The maximum block length allowed by the SECS-I is 254 bytes and the minimum is 10 bytes.

The **reverse bit** (R bit) indicates the direction of the message. The R bit (MSB) is set to „0“ for messages to the reading device and „1“ for messages to the host.

The **device ID** is a unique number to establish the connection with the reading device. It consists of an 8-bit gateway ID (bit 0-7) and a 7-bit reader ID (bit 8-14). The gateway ID in the delivery state corresponds to the last two hexadecimal characters of the serial number of the reader. The reader ID has the value 0x01 in the delivery state. Of course, the device ID can be changed via the corresponding parameters Gateway ID and Reader ID within the validity range. See example with Reader ID 0x01 and Gateway ID 0x00:

Upper Devic-ID (Reader-ID)	**R-Bit**	0	0	0	**0**	**0**	**0**	**1**

Lower Device-ID (Gateway-ID)	**0 0 0 0 0 0 0 0**

Direction reading device to host	0x8000
Direction host to system (reading device)	0x0000

The **W**-bit indicates whether the transmitter of the primary message wait for a reply. If the W bit contains the value 1, it means that a reply is expected.

The **message ID** determines the format and the content of the transmitted message. It consists of a stream and a function. The stream defines the message group and the function, the exact meaning and the syntax of the message. A primary message (request) is defined as an uneven message. A secondary message is defined as an even message (reply).

The **end bit** indicates whether a block is the last block of the message. A value of 1 means that the block is the last block. Since all messages can be transmitted in a block, the block number always has the value 1.

The **system bytes** in the header of each message are used to distinguish primary messages. The system bytes of the reply message must correspond to the system bytes of the corresponding primary message. The system bytes are incremented for each primary message.

The **checksum** is calculated as the numerical sum of the unsigned binary values of all bytes – after the length byte and before the checksum as well as in an individual block.

For more detailed information about the structure and transmission procedure, see SEMI E4, E5, E37, E99.
(SEMI Equipment Communication Standard Message Transfer SECS)

10.2 Directory Data Elements

This section defines the data elements used in the standard SECS-II messages described in the message details section.

Syntax:

Name — A unique name for this data item. This name is used in the message definitions .

Format — A unique name for this data item. This name is used in the message definitions. The allowed element format code that can be used for this default data element. Element format codes are displayed in hexadecimal and octal, as described in chapter Data element. The notification „3 ()“ indicates a signed integer format (30, 31, 32, 34).

Description — A description of the data element with the meaning of each value. Where used standard messages in which the data element occurs.

ACKC3	Format: B[1]

Verification code

0	...	Sensor 0 was the Initiator
1	...	error, not accepted

ACKC5	Format: B[1]

Verification code

0	...	No error
1	...	error, not accepted

ALARM STATE	Format: A[1]

The value of the alarm state refers to the last read. If a read or write error occurs, the alarm state is activated. A successful read or write deactivates the alarm state. When leaving the maintenance mode, the alarm state is also deactivated.

0	...	No error
1	...	error, not accepted

ALCD	Format: B[1]

Alarm-Codebyte. The occurrence of an error is reported. Errors caused by reader operation are not normally reset. In the case of errors occurring in connection with the E84 communication, the rectification of an error status is also displayed.

Bit 8 = 1 Alarm activated
Bit 8 = 0 E84 error has been fixed

Where used S5F1

ALID	Format: B[1]

Alarm Identifier
Only the occurrence of an error is reported. Errors are usually not reset.

0	No error
1	Automatic reading failed, the reader is busy
2	External read failed, the reader is busy
3	External write failed, the reader is busy
4	No transponder could be detected when the sensor was covered, or the carrier was removed too soon (sensor uncovered)
5	Invalid command or parameter detected
6	Unknown error
7	Reserved
8	parity error or checksum error detected
9	An unexpected confirmation has been sent
10	Locked page could not be described
11	Reserved
12	Wrong transponder type
13	External read or write failed because the sensor is not covered
14	Reserved
15	Reserved
16	Reserved
17	Reserved
18	Reserved
19	Reserved
20	Reserved
21	E84: TP1 timeout occured
22	E84: TP2 timeout occured
23	E84: TP3 timeout occured
24	E84: TP4 timeout occured
25	E84: TP5 timeout occured
26	E84: another timeouts
27	E84: Unload is not allowed
28	E84: Load is not allowed
29	E84: unexpected Load event
30	E84: unexpected Unload event
31	E84: invalid CS0 /CS1
32	E84: unexpeceted change of signal value
33	E84: change to maintenance mode (manual mode, testmode)

More about error codes and the corresponding corrective measures can be found in the chapter Error Codes.

Where used S5F1

ALID	Format: A[max40]

Alarm text
The length of the alarm text is between 0 and 40 characters. Depending on the version of the reader, information about the condition of the sensor or the sensors is also transmitted in the event of an error message from the reader

The information should be interpreted as follows:
ALTX[0] Initiator of an error message
“0”: Sensor 0
“1”: Sensor 1 (not available)
“F”: Not assignable
ALTX[1] State of the sensor 0
“0”: Sensor is not used
“1”: Sensor is busy
“E”: Sensor status is not available
“F”: Sensor is not sent
ALTX[3] ‘:’ a semicolon separates the alarm text from the sensor states
Where used S5F1

ATTRID	Format: A[max25]

Name for an attribute for a specific object type.
CIDRW Attribut definitions:

„Configuration“	⇨	Number of heads
„AlarmStatus“	⇨	Current CIDRW sub-state of the alarm state
„OperationalStatus“	⇨	Current CIDRW sub-state in normal operation
“SoftwareRevisionLevel“	⇨	Change (version) of the software - maximum 8 bytes
„CarrierIDOffset“	⇨	Offset of the CID in the CID field (MID area)
„CarrierIDLength“	⇨	Length of the CID in the CID field (MID area)
„SERIALNUM“	⇨	Series number string
„HARDWARE“	⇨	String of the Hardware-Release
„SELF_TEST_RESULT“	⇨	Supply the result of the last self-test
„MANUFACTURER“	⇨	String of the manufacturer
„ECID_00“ ⇨ Parameter 0	⇨	Gateway ID
„ECID_01“ ⇨ Parameter 1	⇨	Baudrate
„ECID_02“ ⇨ Parameter 2	⇨	Inter-character timeout T1
„ECID_03“ ⇨Parameter 3	⇨	Block protocol timeout T2
„ECID_04“ ⇨Parameter 4	⇨	Reply timeout T3
„ECID_05“ ⇨Parameter 5	⇨	Inter-block timeout T4
„ECID_06“ ⇨Parameter 6	⇨	Retry limit RTY

„ECID_07“ ⇨Parameter 7	⇨	TARGETID high byte
„ECID_08“ ⇨Parameter 8	⇨	TARGETID low byte
„ECID_09“ ⇨Parameter 9	⇨	Heartbeat time
„ECID_11“ ⇨Parameter 11	⇨	ReaderID
„ECID_12“ ⇨Parameter 12	⇨	HeadID
„ECID_20“ ⇨Parameter 20	⇨	Sensor Delay for presence sensor
„ECID_22“ ⇨Parameter 22	⇨	Sensor triggered action for presence sensor
„ECID_23“ ⇨Parameter 23	⇨	Triggered read frequency
„ECID_24“ ⇨Parameter 24	⇨	r/w max repeat
„ECID_25“ ⇨Parameter 25	⇨	Transponder Type
„ECID_26“ ⇨Parameter 26	⇨	Sensor activity
„ECID_27“ ⇨Parameter 27	⇨	Sensor Watchport for presence sensor
„ECID_29“ ⇨Parameter 29	⇨	Transponder load duration (read mode)
„ECID_30“ ⇨Parameter 30	⇨	r/w synchronize
„ECID_33“ ⇨Parameter 33	⇨	Automatic Antenna adjustment
„ECID_34“ ⇨ Parameter 34	⇨	Sensor type for presence sensor
„ECID_35“ ⇨ Parameter 35	⇨	Special features
„ECID_36“ ⇨ Parameter 36	⇨	DIP switch activation
„ECID_37“⇨ Parameter 37	⇨	MID area
„ECID_38“⇨ Parameter 38	⇨	Test after software reset
„ECID_40“⇨ Parameter 40	⇨	Transponder load duration (write-mode)
„ECID_41“⇨ Parameter 41	⇨	Delay time between read cycles
„ECID_42“⇨ Parameter 42	⇨	CarrierIDOffset
„ECID_43“⇨ Parameter 43	⇨	CarrierIDLength
„ECID_44“⇨ Parameter 44	⇨	FixedMID
„ECID_45“⇨ Parameter 45	⇨	MIDFormat
„ECID_75“⇨ Parameter 75	⇨	DIP switch state (read only)
„ECID_80“⇨ Parameter 80	⇨	Auto adjust value antenna port 1 (read only)
„ECID_81“⇨ Parameter 81	⇨	Auto adjust value antenna port 2 (read only)
„ECID_82“⇨ Parameter 82	⇨	Auto adjust value antenna port 3 (read only)
„ECID_83“⇨ Parameter 83	⇨	Auto adjust value antenna port 4 (read only)
„ECID_97“⇨ Parameter 97	⇨	Default protocol (read only)
„ECID_98“⇨ Parameter 98	⇨	Protocol change allowed
„ECID_99“⇨ Parameter 99	⇨	Customer Code
„ECID103“ up to “ECID157”	⇨	Display and E84 parameters (103 up to 157)

Header attribute definitions:

„HeadStatus“	⇨	Current state corresponds to „OperationalStatus“
„HeadID“	⇨	Headnumber 00-xx (2Ziffern)

Where used S5F1

ATTRVAL	Format: A[max4]

Value of the specified attribute.

CIDRW-attribute definitions:

„Configuration"	Number of antenna ports „04"
„AlarmStatus"	Current CIDRW sub-state of the
ALARM STATUS	„0" …NO
	„1" …ALARMS
„OperationalStatus"	Current CIDRW sub-state of IN OPERATION „IDLE" …reader is rest mode „BUSY" …reader is busy „MANT" …maintenance mode
„SoftwareRevisionLevel"	Revision (version) of the software (max. 8 bytes)
„SERIALNUM"	serial number string (max. 15 bytes)
„HARDWARE"	String of the hardware release (max. 10 bytes)
„SELF_TEST_RESULT"	Returns the result of the last self-test. A self-test can be triggered by message S18F13 using SSCMD.
„MANUFACTURER"	String from the manufacturer „HERMOS"
„ECID_00" bis „ECID_99"	see data element ECV parameters 0 – 99
"ECID103" to "ECID157"	E84 and display parameters

Head attribute definitions:

„HeadStatus"	Current state
„IDLE"	Reader in REST mode
„BUSY"	reader is busy
„NOOP"	Not in operation
„HeadID"	corresponds to the 2-digit target ID of the first antenna port „01" or „00"

Where used S18F2, S18F3

CMD	Format: U1

display-write commands

Command		Display Data
Code	Function	
0x00	Update Display (Displayspeicher)	
0x01	Clear Display + update (white)	-
0x02	Clear Display + update (black)	-
0x03	Clear Display with headline + update (red, yellow or black)	-
0x04	Clear Display with headline + update (white)	-
0x05	Clear Displaymemory without update (white)	-
0x06	Clear Displaymemory without update (black)	-
0x10	Write Display (black/white) max. 4 lines with 16/20 characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x11	Write Display (white/black) max. 4 lines with 16 characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x12	Write Display (black/red black/yellow) max. 4 lines with xx characters xx… see fontsize	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x13	Write Display (red/white yellow/white) ax. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x14	Write Display with headline(white/black), Text (black/white) max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x15	Write Display with headline(black/white), Text (white/black) max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)

0x16	Write Display with headline(red/black), Text (black/red) max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x17	Write Display with headline(black/red), Text (red/black) max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x20	Clear display and write data to display (black/white) with update Start pixel row and column max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x21	Clear display and write data to display (white/black) with update Start pixel row and column max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x22	Clear display and write data to display (black/red black/yellow) without update Start pixel row and column max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x23	Clear display and write data to display (red/white yellow/white) without update Start pixel row and column max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x30	Write display (black/white) without first deleting the display memory and with display update Start pixel row and column max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x31	Write display (white/black) without first deleting the display memory and with display update Start pixel row and column max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x32	Write display (black/white) without first deleting the display memory and without updating	1 … 64/80 (ASCII) Data depends on

	Start pixel row and column max. 4 lines with xx characters	fontsize (see FONT)
0x33	Write display (white/black) without first deleting the display memory and without updating Start pixel row and column max. 4 lines with xx characters	1 … 64/80 (ASCII) Data depends on fontsize (see FONT)
0x80	Negate display (white/black)	-
0x81	Display colored (red/yellow) black pixels turn red, yellow	-
0x82	Display colored (red/yellow, negated) white pixels turn red, yellow	-
0x83	Delete display color colored pixels turn white	-
0xFF	Write the data to the internal display data structure and then update the entire display. Max. 4 lines of 16/20 characters. The transferred data item FONT is not taken into account.	1 … 64/80 (ASCII) Data depends on parameter 115 Display Fontsize

Where used S3F69

COLUMN	Format: U1

Column defines the column (X position) of the cursor. Position 0 is left.

The display text is written from this position. The number of columns depends on the display type used. Depending on the display command used, the line value is ignored or interpreted as a pixel value. (see data element CMD)

Valid range:

do not care CMD 0x10 - 0x17
Pixel 0 - 249 2-color EInk-Displays black, white
Pixel 0 - 211 3-color EInk-Displays black, white, red/yellow

If you write beyond the valid range (to the right), these characters are ignored.

Where used S3F69

CPVAL	Format: A[]

State request value

OpStatus	Operating status, maintenance or rest mode „OP“ ... operating status „MT“ ... maintenance status
LEDStatus	LED-status „Off“ ... switch off the LED „On“ ... switch on the LED „Flash“ ... switch the LED to flashing mode with 1Hz
LedNo	LED-number, 1 Byte „1“ first LED of the Reader Heads (if available) „2“ second LED of the Reader Heads (if available) „3“ red status LED of the reader „4“ green status LED of the reader
Timeout	Timeout duration, Units seconds „00“: permanently „01“ bis „FF“: Timeout from 1 to 255 s. After the timeout, the LED goes off.

Where used S18F13

	The number of LEDs per antenna input depends on the design of the hardware.

DATA	Format: A[max200]

The data element is a vector or string of unformatted data.
The DATA area depends on the MID area of the transponder and can be between page 1 and page 17.
Read-write transponder DATA corresponds to 8 byte MID
Read-only transponder DATA corresponds to 8 bytes MID

Where used S18F6, S18F7

DATALENGTH	Format: U2

The DATA LENGTH corresponds to the number of bytes to be read or written. The scope depends on the length of the MID range (parameter 37).

Where used S18F5, S18F7

DATASEG	Format: A[2]

Used to identify the requested data.
The DATASEG corresponds to the page number (PAGEID) of the transponder.
„00“ First page of each transponder or first page of the DATA area.

Multipage transponders (pages 1 to 17):

„01“	page 1	„81“	Locked page 1
...	...	...	...
„11“	page 17	„91“	Locked page 17

Read-Only-Transponder „F0“ Read only one page
Read-Write-Transponder „F1“ Read or write only one page

Where used S18F5, S18F7

DSPARG	Format: U1

Additional (unused) argument for the display write.

Where used S3F69

DSPDATA	Format: A[max80]

The ASCII data to be shown on the display.

Where used S3F69

EAC	Format: B[1]

Confirmation code for new reader attribute

0 ... parameter successfully set
1 ... parameter could not be set

Where used S2F16

ECID	Format: U1

Parameter number of the reader.
The values are displayed as decimal values.

Where used S2F13, S2F15

ECV	Format: U1

Value of the reader parameter.
The values are displayed as decimal values, see parameters.

Where used S2F14, S2F15

FONT	Format: U1

Definition of the font size of the display text to be written. Available fonts are Arial 6pt, 8pt, 10pt, 12pt, 14pt, 20pt, 24pt, 28pt, 40pt, 48pt
The automatic line break is performed after 16 or 20 characters, depending on the font size used.

Font:	
6 pt, 8 pt, 10 pt	Line break after 20 characters, next line 30 pt.
12 pt, 14 pt	Line break after 16 characters, next line 30 pt.
20 pt	Line break after 14 characters, next line 30 pt.
24 pt	Line break after 12 characters, next line 30 pt.
28 pt	Line break after 10 characters, next line 36 pt.
40 pt	Line break after 8 characters, next line 50 pt.
48 pt	Line break after 6 characters, next line 60 pt.

If an undefined font size is specified or the data element is not specified, the font size 12 pt. is automatically used.

Where used S3F69

LINE	Format: U1

LINE defines the line (Y position) of the cursor. Position 0 is up.
The display text is written from this position. The number of lines depends on the display type used.
Depending on the display command used, the line value is interpreted as line 0-3 or as a pixel value (see data element CMD).
Valid range:

CMD 0x10 - 0x17:	Line	0 - 3	
CMD > 0x20:	Pixel	0 - 121	2-color EInk-Displays black, white
	Pixel	0 - 103	3-color EInk-Displays black, white, red/yellow

If you write beyond the valid range (below), these characters are ignored.

Where used S3F69

MDLN	Format: A[6]

Plant model number (Hardware version)

Where used S1F2

MF	Format: B[1]

Material Format Code
20: The material port number corresponds to the sensor number and the sensor status.

Where used S3F5, S3F7

MHEAD	Format: B[10]

The data element MHED consists of the head of the SECS message block associated with the defective message block.

Where used S9F1, S9F3, S9F5, S9F9

MID	Format: A

Material ID, predefined area on the transponder in which the unique identifier of the cassette / box is stored. Depending on the type of transponder, the length of the MID can be changed.

Multipage-Transponder: The MID length can be set from „0“ (no MID) to „10“ (MID occupies the first 10 pages).
Read-Write-Transponder: The MID corresponds to the DATA (writable) Read-Only-Transponder: The MID corresponds to the DATA (fixed)

Where used S18F10, S18F11

	Please note the parameters 42-45

MIDAC	Format: B[1]

Material ID verification code

0 Material ID confirmed; the presence sensor was the initiator

1 Not specified

2 Material ID confirmed - reaction to externally triggered process; the message can not be assigned to a sensor

>2 Material ID not confirmed

The initiator can be taken from the data element PTN.

Where used S3F14

MIDRA	Format: B[1]

Material ID verification code

2 confirmation, MID will be sent later in S3F13

Where used S3F12

OFLACK	Format: B[1]

Confirmation code for OFFLINE request.

0 ONLINE accepted (reader is online)

Where used S1F16

ONLACK	Format: B[1]

Confirmation code for ONLINE request.

0 ONLINE accepted (reader is online)

Where used S1F18

PAGEDATA	Format: B[9]

The data element corresponds to the transponder data. It contains the transponder page and the data content of the page.

PAGEDATA [0] Correspond to the page number. The value of the page number is displayed in the data element „DATASEG“.

PAGEDATA [1-8] The 8 bytes (one page) of the transponder ID follow.

Where used S3F7, S3F13

PORTNR	Format: B[1]

The data element corresponds to the port number.

1 ... 4 Port 1 to Port 4

Where used S3F69

PTN	Format: B[1]

Information about the state of the sensor and the source of the message (initiator and OHT).

Initiator Bit0 ….Bit 3:

The initiator sets the number of the sensor that triggered the message.

1 … 4 port1 to port4

OHT Bit 4:

he OHT bit indicates whether the loading or unloading took place manually by an operator or automatically by OHT.

0 … Action triggered by operator/human

1 … Action triggered by OHT

Sensorstate Bit5 ….Bit 7:

The current state of the sensor is described with 3 bits.

0 … Sensor is not occupied

1 … Sensor is occupied or detected

7 … Sensor not defined

Example Load by Operator:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	1	0	0	1	0	0
0x20			0x00	0x04			

0x24: The sensor is covered (0x20), the initiator was a sensor at Port4 (0x04) and the event was triggered by an operator (0x00).

Example: Unload OHT:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	0	1	0	1	0	0
0x00			0x10	0x04			

0x14: The sensor is not covered (0x00), the initiator was the sensor on Port4 (0x04) and the event was triggered by the OHT system (0x10).

Where used S3F5, S3F7, S3F13

PM Information	Format: A[2]

Information about the operating mode

„NE“ … normal execution

„MR“ … operating mode „maintenance“ required

Where used S18F2, S18F4, S18F8, S18F10, S18F12, S18F14

RAC	Format: B[1]

Confirmation code reset
0 … Reset could be executed
1 … Reset could not be executed

Where used S18F20

RIC	Format: B[1]

1 … Power-up-Reset
2 … Software reset (without reset of the Ethernet component)

Where used S2F19

SHEAD	Format: B[10]

Head of the stored SECS message block. Only the last message is saved. This must be confirmed by the host.

Where used S9F9

SOFTREV	Format: A[max 6]

Software version

Where used S1F2

SSACK	Format: A[2]

Result information about the status of the request for the service request.

„NO“ Normal Operation
Indicates the success of the requested operation.

“BC” Barcode could be read successfully

„EE“ Execution error
Transponder data cannot be read. MID sequence cannot be read because not only valid ASCII characters were found in the defined MID area.
However, the condition of the facilities is normal.

„CE“ Communication error.
Syntax error in message, message format, or value.

„HE“ Hardware error
Error in the head of the ID reader / writer, head of the ID reader / writer is deactivated.

„TE“ Transponder error, reading / writing unsuccessful (Tag Error)

„NT“ No transponder (no tag) detected in the antenna area. Subsequent barcode reading was also unsuccessful.

Where used S18F2, S18F4, S18F8, S18F10, S18F12, S18F14

SSCMD	Format: A[max 18]

Specifies an operation to be performed by the subsystem. Used to distinguish between the various subsystem commands displayed.

„ChangeState“ … change status
„GetStatus“ … query staus
„Reset“ … reset CIDRW
„PerformDiagnostics“ … A diagnosis is made.
„ADJUST“ … triggers an automatic alignment of the antenna.
„HERMOSDefParams“ … Basic setting of the readers parameters.
„SetLED „ … Set one of the device LEDs.

CPVAL‘s 1 <LEDStatus>
2 <Timeout>
3 <LEDNo>

Where used S18F13

Status list	Format: A[2]

The status list provides information about the system status.
Consists of „PM Information“ and the current values of the CIDRW attributes „AlarmStatus“, „Operating Status“ and „HeadStatus“.

Status list

L,4
<PMInformation>
<AlarmStatus>
<OperatingStatus>
<HeadStatus>

Where used S18F2, S18F4, S18F8, S18F10, S18F12, S18F14

TARGETID	Format: A[2]

The TargetID is defined with 2 decimal ASCII characters and corresponds to the antenna connections. The 2-digit target ID (Head-ID) is used to set the antenna port 1 to 4 for which the action is to be carried out. The use of the 4-digit TARGETID is currently not supported.

Range: “01” up to “04”

Where used S18F1, S18F3, S18F4, S18F7, S18F9, S18F11, S18F13

10.3 Protocol commands

The message record describes the communication data between a reading device with and a host. The following functions can be used via commands by the host in the reading device or automatically transmitted from the reading device to the host:

Stream 1: (System state)

• Are you there request	S1F1	(Host ⇨ Reader)
• Request Offline	S1F15	(Host ⇨ Reader)
• Request Online	S1F17	(Host ⇨ Reader)

Stream 2: (System control)

• Read parameter	S2F13	(Host ⇨ Reader)
• Write parameter	S2F15	(Host ⇨ Reader)
• Transmit reset	S2F19	(Host ⇨ Reader)

Stream 3: (Material state)

• MID detected by sensor	S3F5	(Reader ⇨ Host)
• MID removed from sensor	S3F7	(Reader ⇨ Host)
• Read MID	S3F13	(Reader ⇨ Host)
• Write Display	S3F69	(Host ⇨ Reader)

Stream 5: (Exception handling)

• Alarm message	S5F1	(Reader ⇨ Host)

Stream 9: (System error)

• Unrecognised device ID	S9F1	(Reader ⇨ Host)
• Unrecognised stream type	S9F3	(Reader ⇨ Host)
• Unrecognised function type	S9F5	(Reader ⇨ Host)
• Invalid data	S9F7	(Reader ⇨ Host)
• Transmission timeout	S9F9	(Reader ⇨ Host)

Stream 18: (System state)

• Read parameter	S18F1	(Host ⇨ Reader)
• Write parameter	S18F3	(Host ⇨ Reader)
• Read data	S18F5	(Host ⇨ Reader)
• Write data	S18F7	(Host ⇨ Reader)
• Read MID	S18F9	(Host ⇨ Reader)
• Write MID	S18F11	(Host ⇨ Reader)
• Subsystem command	S18F13	(Host ⇨ Reader)

10.3.1 Stream 1 (system state)

S1F0: ABORT TRANSACTION (reading device <-> host)

This message is used instead of an expected reply to cancel an action. The function 0 is defined in each stream and has the same meaning in each stream.

S1F0 (header only, no additional elements)

S1F1: ARE YOU THERE REQUEST (reading device <-> host, reply)

Determines whether the reading device or the host is online. S1F1 W (header only, no additional elements)

S1F2: ON-LINE DATA (host -> reading device)

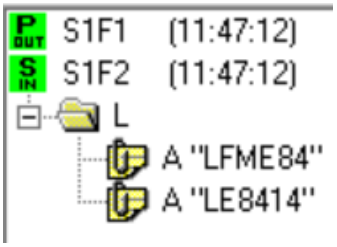
The host indicates that it is online.

S1F2
<L[2]
<A[6] MDLN >
<A[6] SOFTREV

S1F2: ON-LINE (reading device -> host)

The reading device indicates that it is online.

S1F2
<L[2]
<A[6] MDLN >
<A[6] SOFTREV >
>



S1F15: REQUEST OFF_LINE (host -> reading device, reply)

The reading device contains a request to change the communication state to „offline“.

The reading device can only be set to „online“ again using the message S1F17 (or reset S2F19); all other messages are cancelled by message SxF0.

.

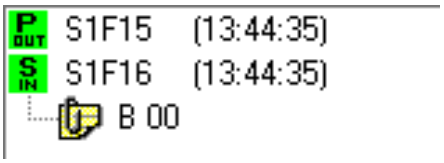
S1F15 W (header only, no additional elements)

S1F16: OFFLINE ACKNOWLEDGE (reading device -> host)

Acknowledgement.

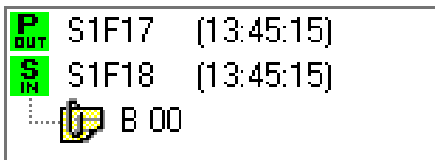
S1F16

<B[1] OFLACK>.



S1F17: REQUEST ON_LINE (host -> reading device, reply)

The reading device contains a request to change the communication state to „online“. S1F17 W (header only, no additional elements)



S1F18: ONLINE ACKNOWLEDGE (reading device -> host)

Acknowledgement

S1F18

<B[1] ONLACK>

10.3.2 Stream 2 (system control)

S2F0: ABORT TRANSACTION (reading device <-> host)

This message is used instead of an expected reply to cancel an action. S2F0 (header only, no additional elements)

S2F13: EQUIPMENT CONSTANT REQUEST (host -> reading device, reply)

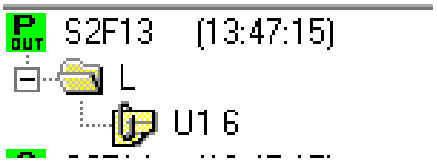
The host requests an attribute (parameter) from the reading device.

S2F13 W

<L[1]

<U1[1] ECID>

>



S2F14: EQUIPMENT CONSTANT DATA (reading device -> host)

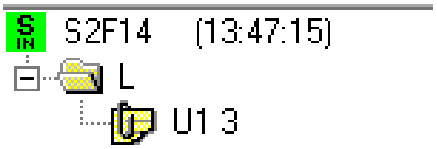
The reading device transmits the requested attribute (parameter) to the host.

S2F14

<L[1]

<U1[1] ECV>

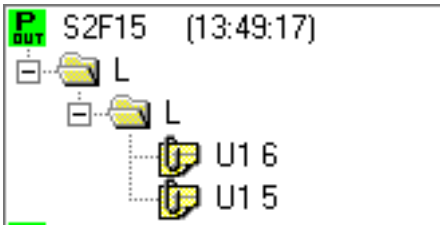
>



S2F15: NEW EQUIPMENT CONSTANT SENT (host -> reading device, reply)

The host changes a reading device attribute (parameter).

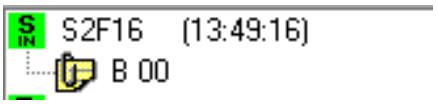
S2F15 W
<L[1]
<L[2]
<U1[1] ECID>
<U1[1] ECV>



S2F16: NEW EQUIPMENT CONSTANT ACKNOWLEDGE (reading device ->host)

The reading device acknowledges the reading device parameter).

S2F16
<B[1] EAC>



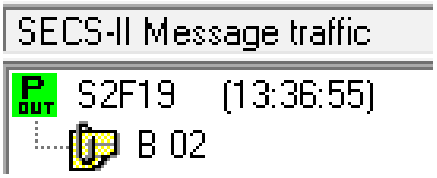
S2F19: RESET SENT (host -> reading device, reply)

The host transmits a request to the reading device to reset the hardware and software.

If a heartbeat time (parameter 9) is set, the reading device transmits a S1F1 message once the reset operation is complete.

A power-up reset takes a few seconds.

S2F19 W
<B[1] RIC>

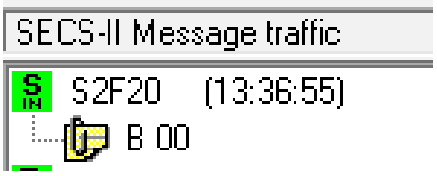


S2F20: RESET ACKNOWLEDGE (reading device -> host)

The reading device acknowledges the reset.

This message is only displayed if a software reset (RIC=2) has been triggered.

S2F20
<B[1] RAC>

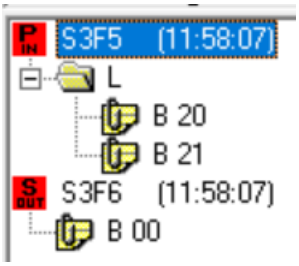


10.3.3 Stream 3 (Material-state)

S3F5: Material found (MID FOUND) (reading device-> host, reply)

The reader sends the information that material has been detected on the input sensor. This message is sent only when a sensor is connected and activated.

(see par. 26 Sensor Activity and par. 27 Watchport)



S3F5 W
<L[2]
<B[1] MF >
<B[1] PTN >
>

S3F6: Material found confirmation (MID FOUND, ACK) (host -> reading device)

The host confirms the message material found.

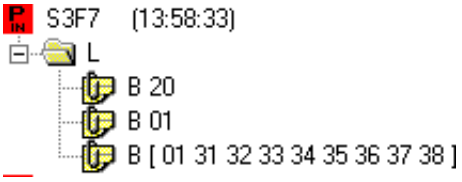
S3F6
<B[1] ACKC3 >

S3F7: Material lost (MID LOST) (reading device -> host, reply)

The reader sends the information that material has been removed from the input sensor. This message is sent only when a sensor is connected and activated.

(see par. 26 Sensor Activity and par. 27 Watchport)

The PAGEDATA are only indicated if the last reading was successful.

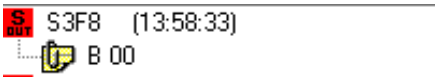


S3F7 W
<L[2]
<B[1] MF >
<B[1] PTN >
<B[9] PAGEDATA >

>

S3F8: Material lost confirmation (MID LOST, ACK) (host -> reading device)

The host confirms the message material lost.

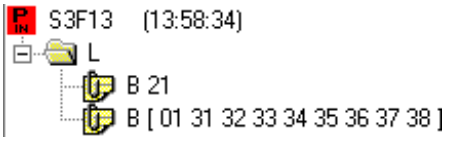


S3F8
<B[1] ACKC3 >

S3F13: MID found (MID READ) (reading device -> host, reply)

The reader sends the MID of the set up material to the host. This message is sent only when a automatic read is enabled.

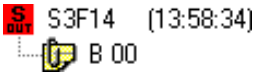
S3F13 W
<L[2]
<B[1] PTN >
<B[9] PAGEDATA >
>



S3F14: Material found confirmation (MID FOUND, ACK) (host -> reading device)

The host confirms the received MID data.

S3F14
<B[1] MIDAC >

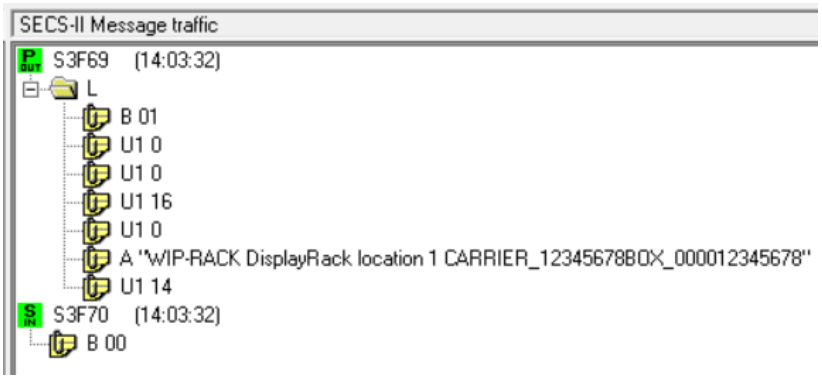


S3F69: Display Data Write (DISPLAY WRITE) (host -> reading device, reply)

The host writes data to the display on the transferred antenna port.

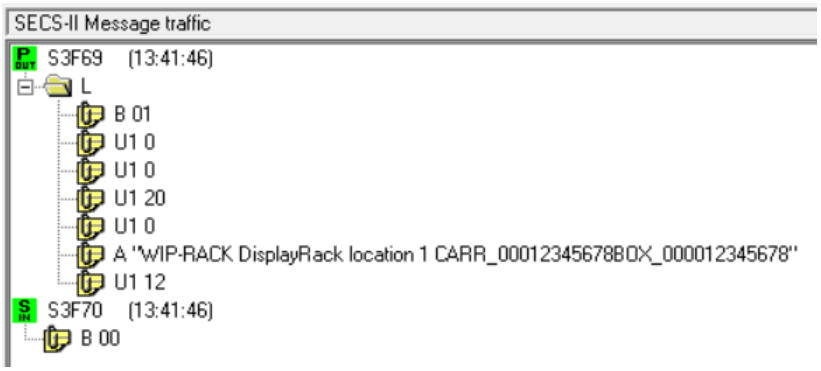
S3F69 W
<L[6]
<B PORTNR >
<U1 COLUMN >
<U1 LINE >
<U1 CMD>
<U1 DSPARG>
<A DSPDATA >
<U1 FONT> *
>

Write display at port 1 (Line 0-3) black, white:

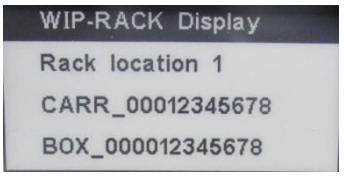


display view:

Write display at port 1 with headerline (Zeile 0-3) black, white:



Display view:

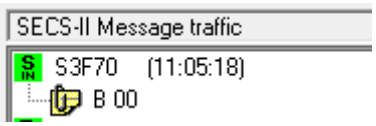


	Specifying the data element FONT (font size) is optional. The maximum number of characters per line depends on the font size used.

S3F70: Display Data Write Acknowledge (DISPLAY WRITE, ACK) (reader device -> host)

The reader confirms the writing on the display.

S3F70
<B ACKC3 >



10.3.4 Stream 5 (Exception handling)

S5F1: Alarm Report (reading device -> host, reply)

The reader reports an error to the host.

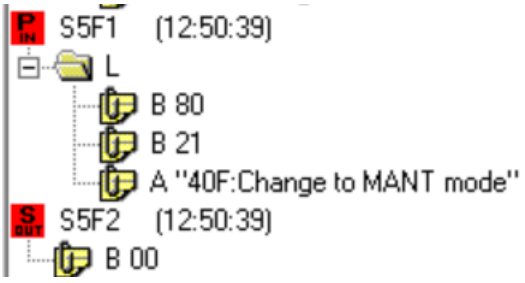
S5F1 W
<L[3]
<B[1] ALCD > Alarmcodebyte
<B[1] ALID > Alarm-ID
<A[MAX 40] ALTX > Alarmtext
>

S5F2: Alarm Report confirmation (Host -> Lesegerät)

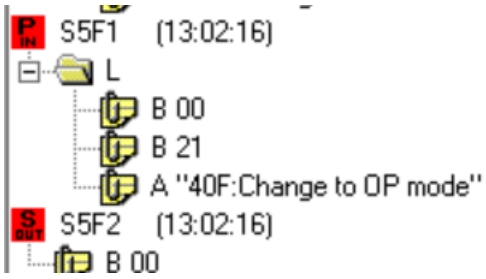
The host confirms the alarm message.

S5F2
<B[1] ACKC5 >

E84 Error 0x21(33) occurs (ALCD=0x80):



E84 Error 0x21(33) eliminated (ALCD=0x00):

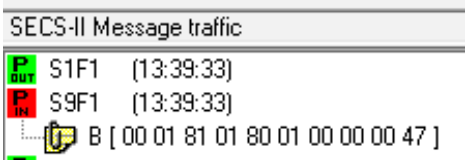


10.3.5 Stream 9 (system error)

S9F1: UNRECOGNIZED DEVICE ID (reading device -> host)

The device ID in the header of the message block does not correspond to the expected device ID.

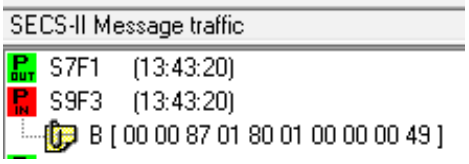
S9F1
<B[10] MHEAD >



S9F3: UNRECOGNIZED STREAM TYPE (reading device -> host)

The reading device does not recognise the stream type in the header of the message block.

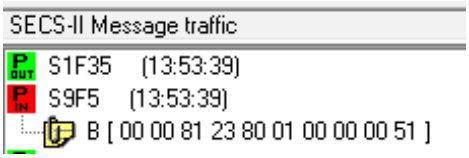
S9F3
< B[10] MHEAD >



S9F5: UNRECOGNIZED FUNCTION TYPE (reading device-> host)

The reading device does not recognise the function number in the header of the message block.

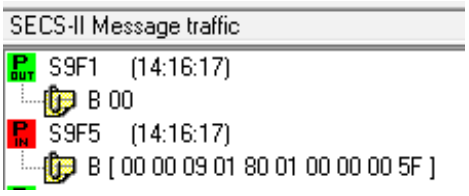
S9F5
< B[10] MHEAD >



S9F7: ILLEGAL DATA (reading device -> host)

The reading device does not recognise the data in the message.

S9F7
< B[10] MHEAD >



S9F9: TRANSACTION TIMER TIMEOUT (reading device -> host)

This message indicates a timeout of a transmission timer and the cancellation of the corresponding transaction. Only the most recently transmitted message (that must be acknowledged by the host) is saved and its acknowledgement is monitored by time.

S9F9
< B[10] SHEAD >

10.3.6 Stream 18 (control and data transfer)

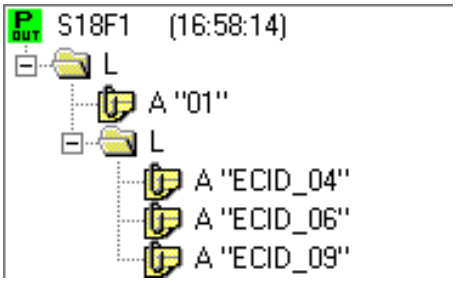
S18F0: ABORT TRANSACTION (reading device -> host)

This message is used instead of an expected reply to cancel an action. S18F0 (header only, no additional elements)

S18F1: Read parameter (host -> reading device, reply)

This message requests the current values of the parameters or states. Several attributes can be queried simultaneously by one message.

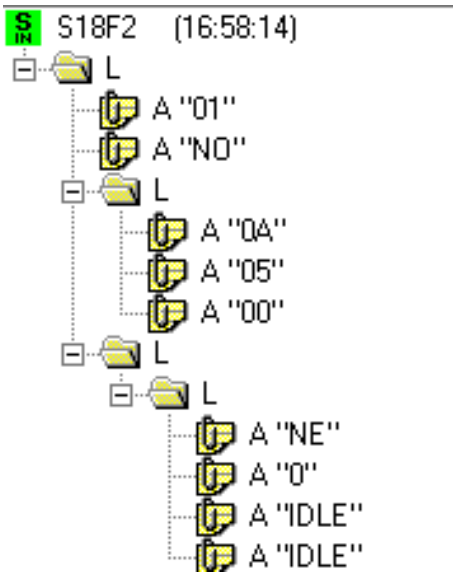
```
S18F1 W
 <L,2
<TARG
 ETID>
        < Ln
          <ATTRID1>
          …
          <ATTRIDn>
        >
     >
  >
```



S18F2: Read parameter, confirmation (reading device -> host)

This message requests the current values of the requested parameters or states.

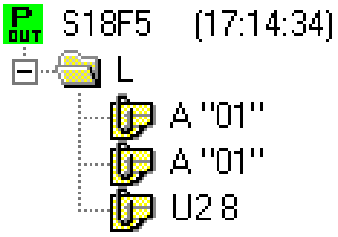
```
S18F2
  <L,4
      <TARGETID>
      <SSACK>
      < L,n
          <ATTRVAL1>
          …
          <ATTRVALn>
              >
      < L,1
          <STATUSLISTE>

      -->
   >
```



If the ATTRID of the S18F1 message is not known, the corresponding element ATTRVAL receives the value <nothing>.

S18F5: Read data (host -> reading device, reply)
This message is used for requesting the antenna head specified in the TARGETID for reading data (from the data area). DATASEG defines the start address of the data to be read. DATALENGTH defines the data volume of the data to be read.

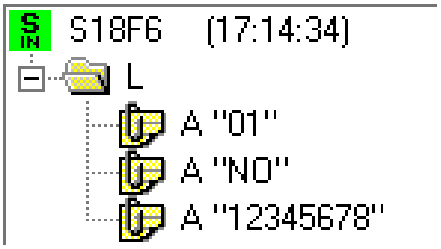
```
S18F5 W
<L,3
        <TARGETID>
        <DATASEG>
        <DATALENGTH>
>
```



If both the DATASEG as well as the DATALENGTH are missing (elements with zero length), all pages of the data area are queried. If only the DATALENGTH is missing, all data on the specified start address is queried.
If the TARGETID is not known, a communication error (CE) occurs.

S18F6: Read data, confirmation (reading device -> host)
This message is used to return the requested information of the antenna head specified in the TARGETID or acknowledge the result of the request.

```
S18F6
<L,3
        <TARGETID>
        <SSACK>
        <DATA>
>
```

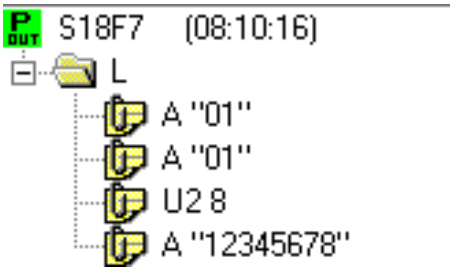


S18F7: Write Data (host -> reading device, reply)

This message is used for requesting the antenna head specified in the TARGETID to write data. DATA- SEG defines the start address of the data to be written. DATALENGTH defines the data volume of the

data to be written.

S18F7 W
<L,4
<TARGETID>
<DATASEG>
<DATALENGTH>
<DATA>
>

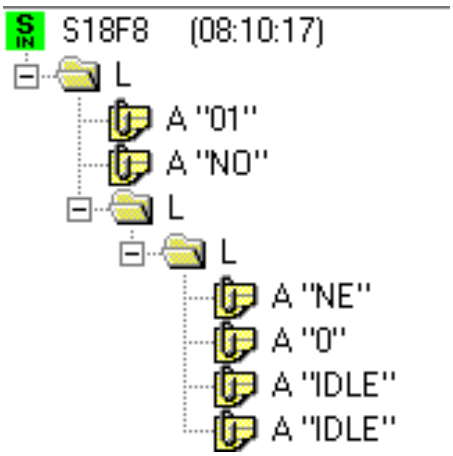


If both the DATASEG as well as the DATALENGTH are missing (elements with zero length), all pages of the data area are overwritten. If only DATALENGTH is missing or if DATALENGTH has the value zero, all data within the specified section must be written.
If the TARGETID is not known, a communication error (CE) occurs.
If DATASEG is missing (elements with zero length), the DATALENGTH value determines the length of the data to be written. If the length of the data to be written is greater than the value of the DATALENGTH, a communication error (CE) occurs.

S18F8: WRITE DATA ACKNOWLEDGE (WDA) (reading device ->host)

This message indicates whether the process for writing data on the antenna port specified in the TARGETID was successful or failed.

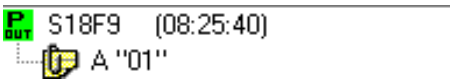
S18F8
<L,3
<TARGETID>
<SSACK>
< L,1
...<STATUSLISTE>
>
>



S18F9: Read MID (host -> reading device, reply)

This message is used for requesting the antenna head specified in the TARGETID for reading the MID.

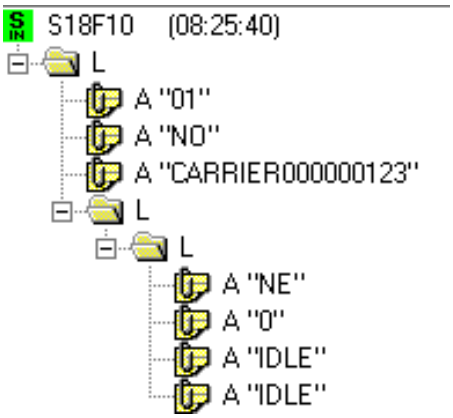
S18F9,W
<TARGETID>



S18F10: Read MID acknowledgement (reading devicet -> host)

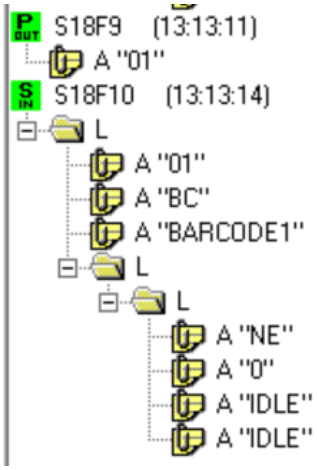
This message returns a requested MID from the antenna head specified in the TARGETID.

S18F10
<L,4
<TARGETID>
<SSACK>
<MID>
< L,1
<STATUSLISTE>
>
>



The reading device can be in maintenance mode (MT) or operating mode (OP) to read the MID with the message S18F9.

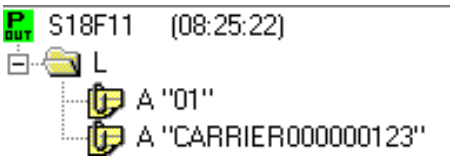
If the MID could not be read, than a connected barcode reader will be triggered to read a barcode:



S18F11: Write data (host -> reading device, reply)

This message is used for writing the MID on the antenna head specified in the TARGETID.

S18F11,W
<TARGETID>
<MID>

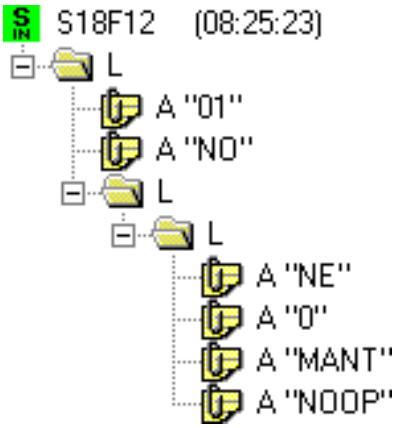


	The reading device must be in maintenance mode to write the MID with the Message S18F11. If the reading device is not in maintenance mode, the execution is cancelled and acknowledged with SSACK = „EE“ equipment error.

S18F12: Write Data, Acknowledgment (reading device -> host)

This message indicates whether the process for writing the MID on the subsystem specified in the TAR- GETID was successful or failed.

S18F12
<L,4
<TARGETID>
<SSACK>
< L,1
<STATUSLISTE>
>
>

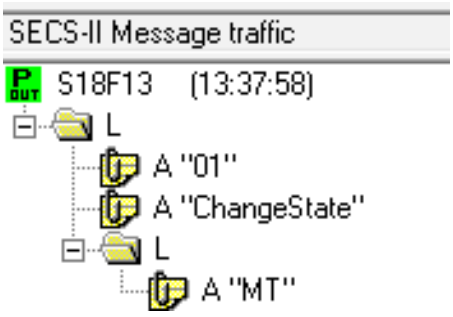


The reading device can be in maintenance mode (MT) to write the MID with the message S18F11.

S18F13: SUBSYSTEM COMMAND (host -> reading device, reply)

This message is used for requesting the subsystem specified in the TARGETID for executing a specific procedure.

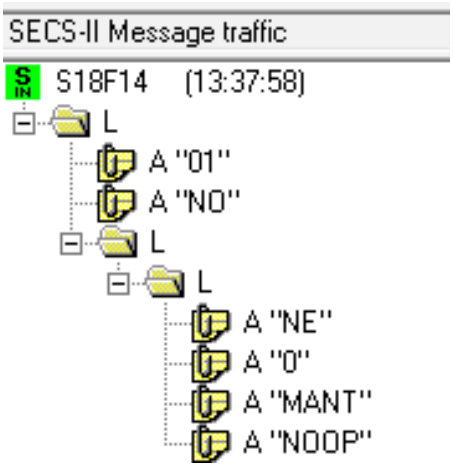
```
S18F13 ,W
<L,3
        <TARGETID>
        <SSCMD>
        <L,n
            1.  <CPVAL>
                …
            n.  <CPVALn>
        >
    >
```



S18F14: SUBSYSTEM COMMAND, ACKNOWLEDGE (Reading device-> host)

This message reports the result of the requested procedure.

```
S18F14 ,W
<L,3
        <TARGETID>
        <SSACK>
        < L,1
          <STATUSLISTE>

        >
     >
```



10.4 Parameter

	*): Some parameters are implemented for each antenna port (→parameter array). Addressing of the parameter takes place via the TargetID of the message. In this realisation, the parameter is present once per antenna port. The Stream18 parameter functions with TargetID must be used ! If no parameter arrays should be used, please ask the manufacturer (parameter 63)!

	**): The reader is always started with the default baud rate 19200Bd because of the protocol recognition. Please ask manufacturer HERMOS if other baud rate is required!

Nr. (DEZ)	Nr. (HEX)	Parameter name	Description
0	0x00	**Gateway ID**	The gateway ID is part of the device ID. The reading unit simultaneously acts as gateway and reader (CID-RW with integrated read head). It corresponds to the „Lower Device-ID“ in the message header. 00 .. 255 Default: Low Byte of serial number
1	0x01	**Baudrate**	Data transmission rate of the RS232 interface Default: 192 19200 Baud **)
2	0x02	**Inter-character Timeout T1**	1 … 100 1/10 s Default : (5) 0,5 s
3	0x03	**Block protocol Timeout T2**	1 … 250 1/10 s Default : (30) 3 s
4	0x04	**Reply Timeout T3**	1 … 120 1 s Default : (10) 10 s
5	0x05	**Inter-block Timeout T4**	1 … 120 1 s Default : (45) 45 s
6	0x06	**Retry limit RTY**	Number of retry attempts for a question or message. Default : 3
9	0x09	**Heartbeat time**	The reader sends a S1F1 message to the host at specified intervals. 0 … no heartbeat 1 … 255 1 s (1-255s) Default : 0 … no Heartbeat
11	0x0B	**ReaderID**	The reader ID is part of the device ID. The reader ID corresponds to the 7 LSB (least significant bits) of the „Upper Device ID“ in the message header. 00 … 127 (0x00 – 0x7F) Default : 0x01

14	0x0E	**Sensor polarity for individual presence sensor**	Type of sensor signal to start an automatic read. The setting is applied for the addressed sensor. 0 … read process when sensor is covered 1 … read process when sensor is uncovered Default : 0 Realisation: a separate parameter for each port *)
18	0x12	**Sensorstate of all heads**	The sensor status of each head is represented by a bit. The parameter can only be queried (readonly). 1 … Sensor is assigned 0 … Sensor is not assigned Bsp. 0b00001010 : Sensor at Head2 and Head4 is assigned
19	0x13	**Data length autoread**	The parameter determines the number of bytes read from the tag during an automatic read 0 … 136 (maximale 17 pages !!) Default: 8 Databytes Realisation: a separate parameter for each port *)
20	0x14	**Sensor delay time**	Delay of the sensor event before a sensor event is triggered and an automatic read operation is started. 0 … 255 (1/10s) Default: 10 (1s) Realisation: a separate parameter for each port *)
21	0x15	**Readmode sensor triggered reading**	Read mode for reading automatically started by external input. 00 - read only one page 01 - read until the end character or empty character2) 02 - read all pages 10 - read only one page with previous sensor Check1) 11 - read until the end character / empty character with previous sensor Check 1) 2) 12 - read all pages with previous sensor Check1) 1) If the Sensor Check (10, 11 and 12) is activated, the assignment of the potential-free input is checked before initiating a read / write process. When used, the read / write process is started, otherwise the error message „NOTAG“ is sent. 2) ‚E‘ or ‚F‘ in ID bits 0 ... 3 of the read ID Default: 00 … (read only one page) Realisation: a separate parameter for each port *)
22	0x16	**Page number for readmode 00**	The page to read for readmode 00: 0: Read all transponders 1: Page 1 Read multipage transponders ... 17: Page 17 Read multipage transponders 240: read read-only transponder 241: read read-write transponder Default: 0 (read all transponders) Realisation: a separate parameter for each port *)

23	0x17	**Triggered read frequency**	For a read / write error, the triggered reading frequency sets the time between two read / write attempts for a transponder; Read frequency in case of a triggered read (no polling) 02 … 10 (1/10s) Default: 5 (0,5s) Realisation: a separate parameter for each port *)
24	0x18	**r/w max repeat**	Maximum number of read and write retries 0 … 255 Default: 5 Realisation: a separate parameter for each port *)
25	0x19	**Transponder Type**	The parameter defines the validity of the read data of the transponder. 0 … read / write type TIRIS Each transponder page consists of 8 data bytes and 2 bytes CRC checksum. The validity of the data bytes is verified by a checksum 1 … A transponder page is interpreted as 10 data bytes without checksum. Default: 0
26	0x1A	**Sensor Activity**	The sensor activity of each head is represented by a bit. For each sensor exactly one bit is provided. 0 … Sensor not activated 1 … Sensor activated Standard: 0x0F
27	0x1B	**Watchport for individual Presence Sensor**	Enables a message to the host if a sensor has been used or if the occupancy has been removed. A sensor is required on use this feature. 0 …message no action 1 …message Sensor assignment has been removed 2 …message Sensor assignment has been detected 3 …message occupancy detected and removed. Default: 3 Realisation: a separate parameter for each port *)
29	0x1D	**Transponder load duration (read mode)**	Charging time of a transponder during the reading process. The default setting should not be changed. Default: 50 … (50ms) Realisation: a separate parameter for each port *)
30	0x1E	**r/w synchronize**	Activates / deactivates the synchronization of the reader. When synchronization is enabled, the reader detects interference or other active readers and synchronizes the read cycle . 0 … synchronization deactivated 1 … synchronization activated Default: 1 … activated

33	0x21	**Automatic antenna tuning**	The parameter controls the allowed triggers of an automatic adjustment of the antenna . 0 … autom. Customization is not activated 1 ... autom. Adaptation via DIP4 2 ... autom. Adaptation by external command 3 ... autom. Adaptation via DIP4 or external command Default: 3
	0x22	**Sensor polarity of all presence sensors**	Type of sensor signal to start an automatic read. One bit is provided for each sensor (Bit0 Sensor 1, ..., Bit3 Sensor 4) with the following meaning 0 … read when sensor is covered 1 … read when sensor is uncovered Value range Parameter: 0x00 bis 0x0F Default: 0 (reading starts on all sensors when sensor is covered)
35	0x23	**Special Features**	**Bit 0**: After a hardware reset, the reader will auto-read if the presence sensor is covered. 0 ... execute read operation after reset, when sensor is covered 1 ... Do not execute a read after reset, when the sensor is covered (standard) **Bit 1**: Trigger sensor-triggered automatic read operation 0 ... reading after detected sensor trigger 1 ... No automatic reading with detected sensor **Bit 2**: 0: non volatile memory is used for saving the reader ID at reset process **Bit 2**: 1: non volatile memory ist not used **Bit 3**: without function **Bit 4**: set external head LED1 at sensor triggered read **Bit 5**: page transfer when reading the first page of a multipage transponder 0 ... without page transfer 1 ... with page transfer **Bit 6**: external head LED1 will be influenced at ASC-W1 mode **Bit 7**: external head LED2 will be influenced at ASC-W1 mode Default: 0x03 … (0000 0011)

36	0x24	**DIP switch activation**	Bit 0 to bit 4 defines the behavior of the four externally accessible DIP switches. Bit0: DIP 4 active Bit1: DIP 3 active Bit2: DIP 2 active Bit3: DIP 1 active Bit4: Value (1): If no test mode is activated (DIP3 = OFF), the set antenna port (via DIP1 and DIP2) is tuned automatically by changing the DIP 4 from OFF to ON. If tuning is successful, the adjustment for the port is saved and the Status LED is switched on. Default: 0x1F
37	0x25	**MID Area**	The parameter defines the range of the MID. The parameter defines the maximum number of pages of a transponder reserved for the MID. One page usually has 8 bytes of data. The default value is customer specific 0…10 pages Default: 0,1 or 2 pages
38	0x26	**Test after software reset**	This parameter activates / deactivates the initial test after a software reset . 0 … No initial test after software reset 1 … initial test after software reset Default: 0
40	0x28	**Transponder load duration (write mode)**	Charging time of a transponder during the writing process. The default setting should not be changed Default: 50 … (50ms)
41	0x29	**Delay time between read cycles**	Delay time between two read cycles. A reduction of the delay increases the reading speed. 1 .. 250 (1 ms) Default: 10 … (10ms)
42	0x2A	**CarrierIDOffset**	Sets the offset of the CID (= MID) within the MID area. The valid value range depends on the value of the MIDArea (maximum MID range) and the CarrierID-Length. Default: 0
43	0x3B	**CarrierIDLength**	Sets the length of the CID (= MID) within the MID area. The valid value range depends on the value of the MIDArea (maximum MID range) and the Carrie-rIDLength. The default value is customer specific! Default: 0 or 16

44	0x2C	**FixedMID**	Defines the read and write behavior of the CID length specified in SEMI E99-03. 0 ... Dynamic CID length The length of the MID is variable. Valid Lengths are from 1 - CID Length Bytes. 1 ... Fixed CID length The length of the MID is at CID Length established. A departure from this length leads to an error message. The default value is customer specific! Default: 0 or 1
45	0x2D	**MIDFormat**	Defines the physical format of the MID data in the transponder. 0 … E99 standard format left justified. Default: 0
46	0x2E	**MID only ASCII characters**	Determines whether the MID is checked for valid ASCII characters (0x20-0x7E). 0 … do not check the MID 1 … run the MID check Default: (1) run the MID check
59	0x3B	**Hardware Error (read only)**	The read-only parameter provides the information as to whether a tuning or antenna error was detected during reading. If there is an error, this is also indicated by the fast flashing red status LED. 0… no error 1… tuning error 2… antenna error 3… tuning and antenna error
60	0x3C	**Threshold Noise Level**	The parameter sets the threshold for the noise level, which is used as a measure of whether an interference field is present in the environment of the antenna. 0… 255 Default: 20
61	0x3D	**Noise Level (read only)**	The read-only parameter provides the information as to which noise level in the environment of the antenna could currently be measured. The value is a measure of ambient noise and interference in the environment of the antenna. Values above an adjustable threshold (parameter 60) are interpreted as a interference (noise).
62	0x3E	**Noise Detected (read only)**	The read-only parameter provides the information as to whether the ambient noise level measured in the environment of the antennas is interpreted as interference (threshold Noise Level exceeded). See also parameters 60 and 61.
64	0x40	**Customer Factory Parameter CFP (read only)**	The parameter, which can actually only be read by the customer, provides the information about which customer factory parameter setting was set during production of the reader. This parameter should only be changed after consultation with Hermos.

70	0x46	**Software Version String (read only)**	The read-only parameter returns the complete identifier of the current firmware.
71	0x47	**Serial number string (read only)**	The read-only parameter provides the complete serial number string.
72	0x48	**Hardwarerevision String (read only)**	The read-only parameter provides the complete identifier for the hardware version.
75	0x4B	**DIP switch status (read only)**	The parameter is used to query the position of all DIP switches. Bit0: DIP 4 (0=off, 1=on) Bit1: DIP 3 (0=off, 1=on) Bit2: DIP 2 (0=off, 1=on) Bit3: DIP 1 (0=off, 1=on) The result is independent of parameter 36 (0x24).
76	0x4C	**Saved fatal errors or events (read only)**	The read-only parameter retrieves all errors and events stored in a ring memory. Since only about 25 characters are read out of the memory per call, it may need to be retrieved several times until it is completely emptied. Fatal errors and the creation of default paramters will be saved.
80	0x50	**Antenna tuning of the antenna 1**	By automatically adjusting the antenna, the influence of ambient conditions can be minimized 00 ... 15 value of antenna adjustment
81	0x51	**Antenna tuning of the antenna 2**	See parameter 80
82	0x52	**Antenna tuning of the antenna 3**	See parameter 80
83	0x53	**Antenna tuning of the antenna 4**	See parameter 80
84	0x54	**Antenna tuning of the addressed antenna**	By automatically adjusting the antenna, the influence of ambient conditions can be minimized 00 ... 15 value of antenna adjustment Default: 08 Realisation: a separate parameter for each port *)

96	0x60	**Set default parameters**	Via this parameter default parameters of the reader can be established. Factor setting parameters remain unaffected! 0... reset all parameters 1... reset all parameters except network settings The query of the parameter returns the fine version of the software version.
97	0x61	**Default protocol**	This parameter provides information about the currently set protocol. Automatic protocol selection distinguishes between "ASCII" and "ASCII" 1 "SECS" protocol. Setting the parameter causes the reader to be restarted if the protocol is changed.… SECS/HSMS 2 … ASCII (not realized at the current software version) Default: 1
98	0x62	**Protocol change allow**	This parameter can be used to allow a detected protocol change. This will then set the new default protocol and restart the device. If the protocol change is suppressed, no automatic change takes place. 0 … protocol change not allowed 1 ... protocol change allowed Default: 0
99	0x63	**Customer Code**	Special customer parameter settings that differ from the basic settings. Several parameter values are set by a customer code. The following parameters are defined: 0 … device version according to SEMI E99-0303 Par. 37 = 2 Par. 42 = 0 Par. 43 = 16 Par. 44 = 1 Par. 45 = 0 3 … device version before SEMI E99-0303 Par. 37 = 1 Par. 42 = 0 Par. 43 = 8 Par. 44 = 0 Par. 45 = 0 4 … device version without MID Par. 37 = 0 Par. 42 = 0 Par. 43 = 0 Par. 44 = 1 Par. 45 = 0 Default: 0
103	0x67	**E84 Timer TP1**	E84 Status monitoring timer value TP1 0 … Timer deactivated 1 … 255 (1s) Default: 2 (2s)

104	0x68	**E84 Timer TP2**	E84 Status monitoring timer value TP2 0 … Timer deactivated 1 … 255 (1s) Default: 2 (2s)
105	0x69	**E84 Timer TP3**	E84 Status monitoring timer value TP3 0 … Timer deactivated 1 … 255 (1s) Default: 60 (60s)
106	0x6A	**E84 Timer TP4**	E84 Status monitoring timer value TP4 0 … Timer deactivated 1 … 255 (1s) Default: 60 (60s)
107	0x6B	**E84 Timer TP5**	E84 Status monitoring timer value TP5 0 … Timer deactivated 1 … 255 (1s) Default: 2 (2s)
108	0x6C	**E84 Check Error Timer**	E84 error status is checked at regular intervals. 0 … Timer deactivated 1 … 255 (1s) Default: 30 (30s)
109	0x6D	**E84 Error Reset Delay Timer**	E84 Error should only be reset after a delay time. 0 … Timer deactivated 1 … 255 (0,1s) Default: 10 (1s)
111	0x6F	**E84 Mode Setup**	**Bit 0**: View E84 error via Telnet too **Bit 1**: View E84 State outptuts via Telnet **Bit 2**: check E84 Errorstatus permanently **Bit 3**: E84 Timer TP5 also monitors the appearance of the signal COMPT=OFF **Bit 4**: Check the E84 input signals when starting **Bit 5**: Indicate resetting E84 errors with S5F1 message **Bit 6**: Value 0: When triggered with S18F9, carry out another barcode reading if no tag could be read. **Bit 7**: Value 0: Show E84 state change and errors at display Default: 0x3F
112	0x70	**Display Setup**	**Bit 0**: general use of the internal display data structure for 4x20 characters per port. **Bit 1**: Show host name in line 1 and port type in line 2 via internal display data structure **Bit 2**: In Zeile 3 die über S18F9 gelesene MID über interne Displaydaten Struktur anzeigen n line 3, display the MID read via S18F9 via internal display data structure **Bit 3**: Value 1: Show "No Tag" in line 3 in the event of faulty reading via internal display data structure Value 0: Delete line 3 in the event of incorrect reading via internal display data structure **Bit 4**: In line 3, delete the MID via internal display data structure if Foup is removed. **Bit 5**: Display E84 status output via internal display data structure in line 4 **Bit 6**: In line 3, display the alternatively read barcode

			via the internal display data structure. **Bit 7**: MID or barcode displayed in line 3 is limited to ASCII characters (0x20 to 0x7E). Default: 0x3F
113	0x71	**Barcode Readtime**	The maximum length of time to wait for a response from the barcode reader before reading is aborted without a result. 1 … 50 (0,1s) Default: 15 (1,5s)
114	0x72	**Display Waittime**	The maximum length of time to wait for the remaining characters to be output before the next output takes place on a display. 1 … 200 (5ms) Default: 100 (500ms)
115	0x73	**Display Fontsize**	When using the internal display data structure, up to 4 lines with 20 characters each can be written. The maximum number of characters per line is determined by the underlying display font size. 6, 8, 10→ 20 characters per line, 4 lines 12, 14 → 16 characters per line, 4 lines 20 → 14 characters per line, 4 lines 28 → 10 characters per line, 3 lines 40 → 8 characters per line, 2 lines 48 → 6 characters per line, 2 lines Standard: 14 (14pt:= 16 characters per line)
116	0x74	**Display Stationport Type**	When using the internal display data structure, the 2nd line contains the description of the port type, which is stored as a parameter for each port. The port type description can contain up to 16 ASCII characters. However, the display font size (Par. 115) determines the actual number of characters that is then displayed as port type in the 2nd line. Default: „SEND“ bzw. „RECEIVE“ Realisation: a separate parameter for each port *)
117	0x75	**Display MID Length**	Maximum number of characters that are shown on the display in line 3 of the determined MID. 0 … do not limit the MID 1 … max. MID Length (Par. 43) Default: 8 Characters
118	0x76	**Sensor 2 Prelltime On (optional E84 Access Mode I/O Modul)**	Bounce time of the optional 2nd sensor, which indicates how long the sensor signal must be stable before the sensor status "On" is recognized. The E84 Access Mode Automatic or Manual can be set via the second optional sensor input. 0 … 255 (1/10s) Default: 5 (0.5s)
119	0x77	**Sensor 2 Prellzeit Off (optionales E84 Access Mode I/O Modul)**	Bounce time of the optional 2nd sensor, which indicates how long the sensor signal does not have to be stable before the sensor status "Off" is recognized. The E84 Access Mode Automatic or Manual can be set via the second optional sensor input. 0 … 255 (1/10s) Default: 5 (0.5s)

120	0x78	**Sensorpolarity (optional E84 Access Mode I/O Modul)**	Type of sensor signal leading to a "Sensor detected" (Sensor On) event. The opposite sensor level then inevitably leads to a "sensor removed" (sensor off) event. A bit is provided for each sensor (Bit0=2nd Sensor Port1…, Bit3=2nd Sensor Port4) with the following meaning: 0 … Sensor On Event, when sensor is covered 1 … Sensor On Event, when sensor is released The upper nibble of the parameter is provided for the optional 3rd sensor. Bit4=3. Sensor Port1, ..., Bit7= 3. Sensor Port4 range: 0x00 bis 0xFF Default: 0 (at all sensors there is a sensor on event if the the sensor is covered)
121	0x79	**E84 Access Mode Setup (optional E84 Access Mode I/O Modul)**	**Bit0(0x01):** Value 0: Sensor input of the second, optional I/O module is operated as a button to switch between the E84 Access Modes Automatic or Manual **Bit0(0x01):** Value1: The level of the second, optional I/O module sensor input determines the E84 access mode. In addition, a laser sensor can be connected to the second optional I/O module and operated. **Bit1(0x02):** If the value is set, then when a Foup is set up triggered by the E84, a measurement of the connected laser sensor is triggered and evaluated to enable further validation of the loading process. Bit0 must also have the value 1 for the operation of the laser sensor! **Bit2(0x04):** Value1: If the sensor input is operated as a button (Bit0 value 0), the E84 status can not only be displayed on an LED of the button, but also on the two respective port LEDs. **Bit3(0x08):** Value1: If the sensor input is operated as a button (Bit0 value 0), the LED of the button also indicates the active E84 wafer handling process by flashing quickly. However, the E84 manual mode is then indicated by a permanently switched-on button LED. **Bit4(0x10):** undocumented internal behavior (value 0 default setting!) **Bit5(0x20):** Value0: The optional 3rd sensor of the second I/O module is activated and can be used to switch to the E84 Access Manual Mode. As long as the 3rd sensor is in the ON state, the respective port remains in E84 Access Manual Mode. Default: 0x04 (CFP1) or 0x23 (CFP2) Realisation: a separate parameter for each port *)
122	0x7A	**Max Lasersensor Reading Time (optional E84 Access Mode I/O Modul)**	If a laser sensor is operated (only CFP2) on the optional second I/O module, this parameter defines the maximum time for which the laser sensor remains switched on for a measurement. 1 … 100 (1/10s) Default: 10 (1s)

123	0x7B	**Setup E84 Access Mode I/O Modul**	**Bit0(0x01)**: Value 1: The current E84 states are generally displayed on the respective LED of the button or the respective port LEDs. **Bit7(0x80)**: Value 0: Changes to the inputs of the second I/O module are generally processed Default: 0x01
125	0x7D	**Test Activation Time Lasersensor Port1 (write only)** **E84 Access Mode Port1 (read only)**	This parameter can be used to activate a laser sensor connected to the second I/O module for the transferred time. Used to test the laser sensor. 1 … 100 (1/10s) When the parameter is queried, it is determined whether the reader port is in E84 manual access mode 0 … Automatic Access Mode 1 … Manuel Access Mode Default: 0 (Automatic Access Mode)
126	0x7E	**Test Activation Time Lasersensor Port2 (write only)** **E84 Access Mode Port2 (read only)**	This parameter can be used to activate a laser sensor connected to the second I/O module for the transferred time. Used to test the laser sensor. 1 … 100 (1/10s) When the parameter is queried, it is determined whether the reader port is in E84 manual access mode 0 … Automatic Access Mode 1 … Manuel Access Mode Default: 0 (Automatic Access Mode)
127	0x7F	**Test Activation Time Lasersensor Port3 (write only)** **E84 Access Mode Port3 (read only)**	This parameter can be used to activate a laser sensor connected to the second I/O module for the transferred time. Used to test the laser sensor. 1 … 100 (1/10s) When the parameter is queried, it is determined whether the reader port is in E84 manual access mode 0 … Automatic Access Mode 1 … Manuel Access Mode Default: 0 (Automatic Access Mode)
128	0x80	**Test Activation Time Lasersensor Port4 (write only)** **E84 Access Mode Port4 (read only)**	This parameter can be used to activate a laser sensor connected to the second I/O module for the transferred time. Used to test the laser sensor. 1 … 100 (1/10s) When the parameter is queried, it is determined whether the reader port is in E84 manual access mode 0 … Automatic Access Mode 1 … Manuel Access Mode Default: 0 (Automatic Access Mode)
129	0x81	**I/O-Modul Test**	When the I/O module test feature is activated, it is possible in test mode (DIP3=On) to test the two inputs and the output of the respective E84 port. As long as one of the two inputs of the I/O module of an E84 port is occupied, the respective output of the I/O module is set 0 … I/O Modul Test Feature is not activated 1 … I/O Modul Test Feature is activated Default: 0

130	0x82	**Sensor 3 Prelltime On (optionales E84 Access Mode I/O Modul, 3. Sensor)**	Bounce time of the 3rd sensor, which indicates how long the sensor signal must be stable before the sensor status "On" is recognized. As long as the 3rd sensor of the respective port is in the "On" state, the associated port remains in E84 Access Mode Manual. 0 … 255 (1/10s) Default: 5 (0.5s)
130	0x69	**E84 Timer TP3**	E84 Status monitoring timer value TP3 0 … Timer deactivated 1 … 255 (1s) Default: 2 (2s)
150-152	0x96-0x98	**I/O Testing**	Each of the E84 port sensors (Par.150: Foupsensor, Par.151: button for E84 mode switching, Par.152: additional 3rd sensor for E84 mode) can be set via an internal status with each parameter. Exactly one bit is assigned to each E84 port. For internal use only!
153	0x99	**E84 Mode Additional Setup**	**Bit0(0x01):** Value 1: In the event of a sensor event from the 3rd sensor (2nd I/O module present) on any port, this leads to a change to manual E84 mode on all E84 ports. **Bit1(0x02):** Value1: A button event from the 2nd sensor (2nd I/O module present) on any port causes the E84 mode to change on all ports. **Bit2(0x04):** Value0: When changing the 3rd sensor to the E84 automatic mode, a further release by the 2nd sensor (button !) of the respective E84 port is necessary. **Bit2(0x04):** Value1: When changing the 3rd sensor to the E84 automatic mode, a further release by the 2nd sensor (button !) of the respective E84 port is no longer necessary. Default: 0
154	0x9A	**E84 Foup state (read only)**	A readonly parameter to read the foup state of the E84 assisted foup loading or unloading process 0…initialization value or foup transfer without E84 support 1…E84 assisted foup load process is running 2…E84 assisted foup unload process is running 3…In the E84 assisted foup load process the port sensor detects the foup 4…In the E84 assisted foup unloading process, the foup was released by the port sensor 5…E84 assisted foup load process is ready 6…E84 assisted foup unload process is ready Default: 0 Realisation: a separate parameter for each port *)
155	0x9B	**E84 state (read only)**	A readonly parameter to read the current state of the E84 state machine. For internal use only! Default: 3 (IDLE) Realisation: a separate parameter for each port *)

156	0x9C	**E84 error (read only)**	A readonly parameter to read the current error state of the E84 state machine. For internal use only! Default:0 (NOERROR) Realisation: a separate parameter for each port *)
157	0x9D	**E84 manual access mode (read only)**	A readonly parameter to read the current E84 access mode state of the E84 state machine. 0 … E84 automatic access mode 1 … E84 manual access mode Default:0 (automatic access mode) Realisation: a separate parameter for each port *)

10.5 Examples of a SECS / HSMS message

Start routine of the HSMS protocol:

```
16:00:31 Length Byte    ( 00 00 00 0A )
16:00:31 Select.req     ( FF FF 00 00 00 01 80 00 00 01 )
16:00:31 Length Byte    ( 00 00 00 0A )
16:00:31 Select.rsp     ( FF FF 00 00 00 02 80 00 00 01 )
16:00:31 Length Byte    ( 00 00 00 0A )
16:00:31 Linktest.req   ( FF FF 00 00 00 05 80 00 00 02 )
16:00:31 Length Byte    ( 00 00 00 0A )
16:00:31 Linktest.rsp   ( FF FF 00 00 00 06 80 00 00 02 )
16:00:32 Length Byte    ( 00 00 00 0A )
16:00:32 Linktest.req   ( FF FF 00 00 00 05 80 00 00 01 )
16:00:32 Length Byte    ( 00 00 00 0A )
16:00:32 Linktest.rsp   ( FF FF 00 00 00 06 80 00 00 01 )
```

S1F1 – Query Software version

```
16:02:15 Length Byte    ( 00 00 00 0A )
16:02:15 Header         ( 01 34 81 01 00 00 00 00 00 35 )
16:02:15 Length Byte    ( 00 00 00 1C )
16:02:15 Header         ( 01 34 01 02 00 00 00 00 00 35 )
16:02:15 Data           ( 01 02 41 06 4C 46 4D 5F 34 78 41 06 4C 46 4D 53 31 32 )
```

```
S1F1    (16:02:15)
S1F2    (16:02:15)
L
  A "LFM_4x"
  A "LFMS12"
```

```
E84 reader
S1F1    (11:47:12)
S1F2    (11:47:12)
L
  A "LFME84"
  A "LE8414"
```

S2F13 – Query parameter 3

```
16:04:39 Length Byte    ( 00 00 00 0F )
16:04:39 Header         ( 01 34 82 0D 00 00 00 00 00 36 )
16:04:39 Data           ( 01 01 A5 01 06 )
16:04:39 Length Byte    ( 00 00 00 0F )
16:04:39 Header         ( 01 34 02 0E 00 00 00 00 00 36 )
16:04:39 Data           ( 01 01 A5 01 03 )
```

```
S2F13   (16:04:39)
L
  U1 6
S2F14   (16:04:39)
L
  U1 3
```

S2F15 – Set parameter 3 to value 5

```
16:06:09 Length Byte    ( 00 00 00 14 )
16:06:09 Header         ( 01 34 82 0F 00 00 00 00 00 37 )
16:06:09 Data           ( 01 01 01 02 A5 01 06 A5 01 05 )
16:06:10 Length Byte    ( 00 00 00 0D )
16:06:10 Header         ( 01 34 02 10 00 00 00 00 00 37 )
16:06:10 Data           ( 21 01 00 )
```

```
S2F15   (16:06:09)
L
  L
    U1 6
    U1 5
S2F16   (16:06:10)
  B 00
```

Automatic reading by sensor event:
S3F5 - Material found
S3F13 - MID read

```
16:08:09 Length Byte   ( 00 00 00 12 )
16:08:09 Header   ( 01 34 83 05 00 00 00 02 00 09 )
16:08:09 Data   ( 01 02 21 01 20 21 01 21 )
16:08:09 Length Byte   ( 00 00 00 0D )
16:08:09 Header   ( 01 34 03 06 00 00 00 02 00 09 )
16:08:09 Data   ( 21 01 00 )
16:08:09 Length Byte   ( 00 00 00 1A )
16:08:09 Header   ( 01 34 83 0D 00 00 00 02 00 0A )
16:08:09 Data   ( 01 02 21 01 21 21 09 01 43 41 52 52 49 45 52 30 )
16:08:09 Length Byte   ( 00 00 00 0D )
16:08:09 Header   ( 01 34 03 0E 00 00 00 02 00 0A )
16:08:09 Data   ( 21 01 00 )
```

```
S3F5   (16:08:09)
  L
    B 20
    B 21
S3F6   (16:08:09)
  B 00
S3F13   (16:08:09)
  L
    B 21
    B [ 01 43 41 52 52 49 45 52 30 ]
S3F14   (16:08:09)
  B 00
```

S3F7 - Material lost

```
16:08:11 Length Byte   ( 00 00 00 1D )
16:08:11 Header   ( 01 34 83 07 00 00 00 02 00 0B )
16:08:11 Data   ( 01 03 21 01 20 21 01 01 21 09 01 43 41 52 52 49 45 52 30 )
16:08:11 Length Byte   ( 00 00 00 0D )
16:08:11 Header   ( 01 34 03 08 00 00 00 02 00 0B )
16:08:11 Data   ( 21 01 00 )
```

```
S3F7   (16:08:11)
  L
    B 20
    B 01
    B [ 01 43 41 52 52 49 45 52 30 ]
S3F8   (16:08:11)
  B 00
```

S18F5 - Read data

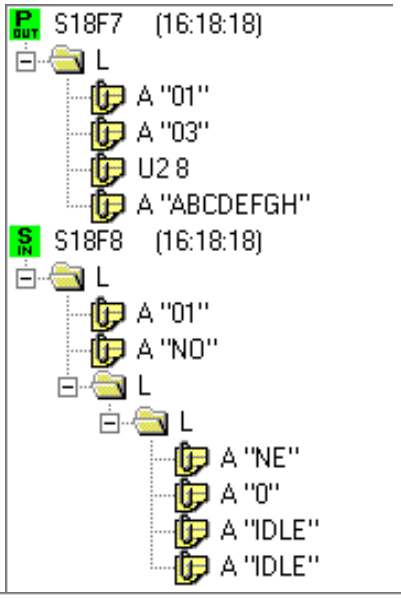
Antenna port: 1
Page: 3
Data length: 8

```
16:14:20 Length Byte   ( 00 00 00 18 )
16:14:20 Header   ( 01 34 92 05 00 00 00 00 00 41 )
16:14:20 Data   ( 01 03 41 02 30 31 41 02 30 33 A9 02 00 08 )
16:14:20 Length Byte   ( 00 00 00 1E )
16:14:20 Header   ( 01 34 12 06 00 00 00 00 00 41 )
16:14:20 Data   ( 01 03 41 02 30 31 41 02 4E 4F 41 08 41 42 43 44 45 46 47 48 )
```

```
S18F5   (16:14:20)
  L
    A "01"
    A "03"
    U2 8
S18F6   (16:14:20)
  L
    A "01"
    A "NO"
    A "ABCDEFGH"
```

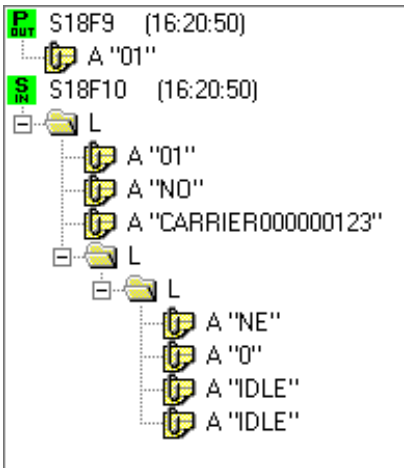
S18F7 - Write data

Antenna port: 1
Page: 3
Data length: 8
Data: „ABCDEFGH



16:18:18 Length Byte (00 00 00 22)
16:18:18 Header (01 34 92 07 00 00 00 00 00 42)
16:18:18 Data (01 04 41 02 30 31 41 02 30 33 A9 02 00 08 41 08 41 42 43 44 45 46 47 48)
16:18:18 Length Byte (00 00 00 2B)
16:18:18 Header (01 34 12 08 00 00 00 00 00 42)
16:18:18 Data (01 03 41 02 30 31 41 02 4E 4F 01 01 01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C 45)

S18F9 – Read MID

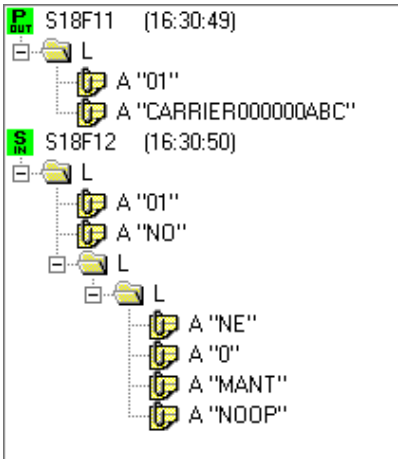


16:20:50 Length Byte (00 00 00 0E)
16:20:50 Header (01 34 92 09 00 00 00 00 00 45)
16:20:50 Data (41 02 30 31)
16:20:50 Length Byte (00 00 00 3D)
16:20:50 Header (01 34 12 0A 00 00 00 00 00 45)
16:20:50 Data (01 04 41 02 30 31 41 02 4E 4F 41 10 43 41 52 52 49 45 52 30 30 30 30 30 30 31 32 33 01 01 01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C 45)

S18F11 - Describe MID

With the message S18F11 the MID area can be described. The MID can only be written in maintenance mode.

Use the S18F13 message to put the reading device into the maintenance state.



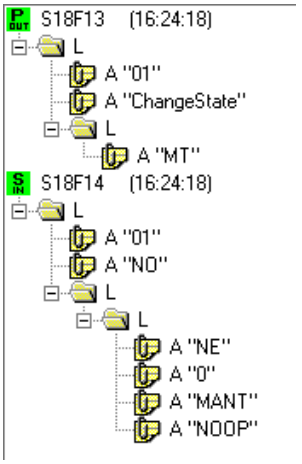
16:30:49 Length Byte (00 00 00 22)
16:30:49 Header (01 34 92 0B 00 00 00 00 00 48)
16:30:49 Data (01 02 41 02 30 31 41 10 43 41 52 52 49 45 52 30 30 30 30 30 30 41 42 43)
16:30:50 Length Byte (00 00 00 2B)
16:30:50 Header (01 34 12 0C 00 00 00 00 00 48)
16:30:50 Data (01 03 41 02 30 31 41 02 4E 4F 01 01 01 04 41 02 4E 45 41 01 30 41 04 4D 41 4E 54 41 04 4E 4F 4F 50)

S18F13 – Subsystem Command „Change to Maintenance Mode”

The reading device must first be set to maintenance mode to write tot he MID area.

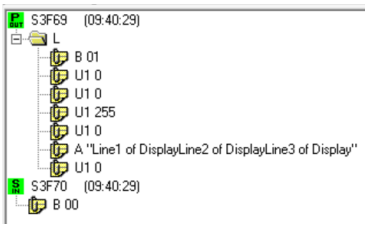
SSCMD = „ChangeState“
CPVAL = „MT“ (Maintenance)

The CPVAL „OP“ can be used to switch back to the normal operating mode.



16:24:18 Length Byte (00 00 00 23)
16:24:18 Header (01 34 92 0D 00 00 00 00 00 47)
16:24:18 Data (01 03 41 02 30 31 41 0B 43 68 61 6E 67 65 53 74 61 74 65 01 01 41 02 4D 54)
16:24:18 Length Byte (00 00 00 2B)
16:24:18 Header (01 34 12 0E 00 00 00 00 00 47)
16:24:18 Data (01 03 41 02 30 31 41 02 4E 4F 01 01 01 04 41 02 4E 45 41 01 30 41 04 4D 41 4E 54 41 04 4E 4F 4F 50)

S3F69 – Write to internal structure (cmd=0xFF) of display



To describe the display of the addressed head (01).
Command 255(0xFF) is used to write to the internal display data structure and update the output. Beginning at line index 0 and column index 0 the first 3 lines are written. The text of line 4 will not be changed. The output is in the font size specified via the Display Fontsize parameter!

```
09:40:29 Length Byte ( 00 00 00 0A )
09:40:29 Linktest.rsp ( FF FF 00 00 00 06 80 00 00 36 )
09:40:29 Length Byte ( 00 00 00 50 )
09:40:29 Header ( 01 34 83 45 00 00 00 00 00 03 )
09:40:29 Data ( 01 07 21 01 01 A5 01 00 A5 01 00 A5 01 FF A5 01 00 41 30 4C 69 6E 65 31 20 6F 66 20 44 69 73 70 6C 61 79 4C 69 6E 65 32 20 6F 66 20 44 69 73 70 6C 61 79 4C 69 6E 65 33 20 6F 66 20 44 69 73 70 6C 61 79 A5 01 00 )
09:40:29 Length Byte ( 00 00 00 0D )
09:40:29 Header ( 01 34 03 46 00 00 00 00 00 03 )
09:40:29 Data ( 21 01 00 )
```

10.6 Error codes

SSACK	Name	Description	Cause	Corrective action
NO	Normal operation	Indicates the success of the requested operation		no
BC	Barcode Read with S18F9	Indicates the success of the barcode read operation		no
EE	Execute Error	Transponderdaten und Lese-ID-Sequenz können nicht gelesen werden	Reader processes previous read or write request	Please wait until previous query is finished
			Transponder has no or too few valid ASCII characters in the MID area	Program transponder with valid ASCII characters in the MID area
			Parameters for MID range do not match the transpon-der data	Adjust reader parameter for MID area according to transponder data area for MID
			Wrong reader mode (MANT / OP) for functional operation	Switch to proper mode (MANT to write MID)
CE	Communica tion Error	Syntax error with message or message format or wrong value	List format, list set or data type is wrong	Check SECS message syntax
			Data sent with a command is incorrect	Check command syntax and data
			Send parameter is not im-plemented or out of range	Check parameter syntax and value

11. Service and Troubleshooting

11.1 General information

	Follow the basic safety instructions in the chapter Safety instructions.

- The maintenance of the reading device and its components may only be performed by the manufacturer.
- Observe the instructions in this section when errors occur. Do not perform any further troubleshooting measures in addition to the described measures.
- In case of doubt concerning errors and handling them, contact the manufacturer.

11.2 Troubleshooting personnel

Troubleshooting must only be performed by specially trained personnel. In case of doubts concerning the necessary qualifications, contact the manufacturer.

The handling of device errors by untrained personnel as well as the incorrect handling of the device can result in personal injuries as well as damages to the reading device and/or connected devices.

11.3 Safety instructions

All components of the antenna oscillating circuit carry high voltage.

Only use spare parts specified by the manufacturer.
Unauthorised substitution of parts can result in fire, electric shock or other hazards.

Electrostatic charges damage electronic components within the device.
ESD protective measures must be applied prior to opening the unit.

Carefully remove the housing covers to prevent damage.
Do not operate the device when the housing is open.

Never short circuit the fuse! This may result in fire or damages on the device. Only use fuses specified by the manufacturer.

11.4 Error indications on the device

Power-LED is off

- Check the power supply and the connecting cables!
- Remove the power adapter. Open the case and check the fuse. Replace the fuse with a fuse specified by the manufacturer!
- If the above measures do not resolve the problem, contact the manufacturer.

11.5 No communication with the reading device

- Check the interface connection cable for damage and correct connection!
- Check the power LED is lit, and make sure that the status indicator does not indicate an error.
- Try to read in the reader with the HERMOSDevice-Discoverer and check the device settings.
- If the above measures do not correct the error, please contact the manufacturer.

11.6 Software releases

Release-Date	Version	Description
21.08.2020	LFM E84 V1.0 (SECS/HSMS)	Initial Software Release (without Barcode, PTN Bit4 Operator)
23.09.2020	LFM E84 V1.1 FV00 (SECS/HSMS)	Barcode Connection, PTN Bit4 Operator, USB-Interface, E84 Error Handling new version E84 Status Display View
27.10.2020	LFM E84 V1.1 FV01 (SECS/HSMS)	4-line display output via internal display data structure. Parameter 112 Display Setup Parameter 115 Display Fontsize Parameter 116 Stationport Type Display command 0xFF
04.11.2020	LFM E84 V1.1 FV02/FV03 (SECS/HSMS)	Read Barcode distributed via UDP too
17.11.2020	LFM E84 V1.2 FV00 (SECS/HSMS)	MID check and format Parameter 46 MID only ASCII Parameter 117 MID Display Length
08.06.2021	LFM E84 V1.3 FV00 (SECS/HSMS)	Optional I/O Modul for E84 Access Mode is distributed
12.09.2021 12.10.2021	LFM E84 V1.3 FV01/02/03 (SECS/HSMS)	Optional I/O Modul for E84 Access Mode: Additional Mode CFP2 with using a lasersensor
02.08.2022	LFM E84 V1.4 FV00 (SECS/HSMS)	New optional I/O Modul with a 3. sensor at every Port. Only for CFP1 distributes the 3.sensor!
24.11.2022	LFM E84 V1.4 FV01 (SECS/HSMS)	Par. 129 for testing the 2. I/O Modul (2. and 3. Sensor) in the testmode
23.06.2023	LFM E84 V1.4 FV02 (SECS/HSMS)	Par. 150-152 for internal testing of sensors. Par. 153 Additional E84 Mode Setting
18.07.2023	LFM E84 V1.4 FV03 (SECS/HSMS)	Par. 154,155, 156 and 157 read E84 foupstate, E84 state, E84 error and E84 access mode

11.7 Customer service

HERMOS AG
Track & Trace RFID Division
Gartenstraße 19
D-95490 Mistelgau
Germany

Phone	+49 (0) 9279 – 991 -0
Fax	+49 (0) 9279 – 991 -100
E-Mail	rfid@hermos.com
URL:	http://www.hermos.com/de/produkte/rfid/

12. Disassembly and storage

12.1 Disassembly

- Remove the power supply
- Remove all cables
- Loosen and remove the mounting screws
- Remove the reading device from the installation area

12.2 Storage

Store the reading device and its components in a clean and dry environment. Make sure that the power supply has been removed.
Observe the required storage conditions specified in the technical data.

13. Transport and disposal

13.1 Transport

Use a solid cardboard box for the transport.
Use enough cushioning material to protect the device on all sides.

13.2 Disposal

The device and its components are made of various materials.
Disconnect the electronic components from the housing and dispose of them separately.

- Do not dispose of the unit in normal household waste.
- Dispose of the materials separately and according to the legal regulations of your country.
- Housing and attachments as plastic waste
- Electronic components, antennas and cables as electronic waste